

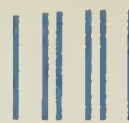
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Census of Manufactures

MC82-I-36A

INDUSTRY SERIES

Electrical Measurement and Distribution Equipment

Industries 3612, 3613, 3621, 3622, 3623, 3624, and 3629



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The publications
from the 1982 Economic and
Agriculture Censuses are dedicated
to the memory of Shirley Kallek,
Associate Director for Economic Fields.
During her career at the Bureau of the
Census (1955 to 1983), she continually
directed efforts to improve
the timeliness and accuracy of
economic statistics.

1982

Census of Manufactures

MC82-I-36A

INDUSTRY SERIES

Electrical Measurement and Distribution Equipment

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3613	Switchgear and Switchboard Apparatus
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Issued February 1985



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INDUSTRY DIVISION
Gaylord E. Worden, Chief

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INTRODUCTION

ECONOMIC CENSUSES OVER TIME

The early beginnings of America's industrial output were first measured in the United States in the 1810 Decennial Census and again in 1820, when questions on manufacturing were included with those for population. Beginning with the 1840 Decennial Census, there were enumerations of manufactures and mineral industries at 10-year intervals up to and including the year 1900 for manufactures and 1940 for mineral industries. The latter census was again taken for 1954, 1958, 1963, and 1967.

Because of the increasing dominance of manufacturing in the early 20th century, Congress directed that quinquennial censuses of manufactures be taken beginning in 1905. However, from 1919 through 1939, these censuses were conducted every 2 years. The need for war-related current surveys in the early 1940's postponed the next census of manufactures until 1948 (for 1947). That census was again taken for 1954, 1958, 1963, and 1967.

Retail and wholesale trade data were first collected in 1930, and in 1933 information on selected service industries was added to the data-collection operation. These business censuses, as they were called, were again taken for 1935, 1939 (as part of the 1940 decennial program), 1948, 1954, 1958, 1963, and 1967.

Information on construction industries was obtained first in 1930 and again for 1935 and 1939. Data for the full spectrum of construction industries were not gathered again until 1968 (for 1967).

The need for transportation data to supplement information available from existing governmental or private sources was recognized by Congress in the late 1950's and early 1960's. The census of transportation (consisting of several surveys) was taken first for 1963 and again for 1967.

Since 1967, all of the above censuses have been taken quinquennially as part of the Census Bureau's economic census program. (For the 1977 censuses, the coverage of the service industries was broadened from "selected services" to "all services, except religious organizations and private households." A total of 41 additional four-digit standard industrial classifications¹ (SIC's) in 7 SIC major groups was added to the scope of the census. While most of the industries included for the first time for 1977 were covered again for 1982, some were not, i.e., hospitals; elementary and secondary schools; colleges, universities, and professional schools; junior colleges and technical institutes; labor unions and similar labor organizations; and political organizations.)

The first manufacturing census for an outlying area was conducted in Puerto Rico for the year 1909. Thereafter, with the exception of 1929, a census was taken at 10-year intervals through 1949. The first censuses of retail trade, wholesale trade, and selected service industries in Puerto Rico were conducted in 1939. These censuses also were taken for the years 1949, 1954, 1958, 1963, and 1967. A census of construction industries was introduced first in Puerto Rico for 1967. These censuses of Puerto Rico have been taken since then for the years 1972, 1977, and 1982.

Censuses of manufactures, retail trade, wholesale trade, and selected service industries were conducted in Guam and the

Virgin Islands of the United States for 1958, 1963, 1967, 1972, 1977, and 1982. Censuses of mineral industries were taken in the Virgin Islands of the United States for the years 1958, 1963, and 1967 but not since that time. A census of construction industries was also undertaken in these areas for 1972, 1977, and 1982.

Retail trade, wholesale trade, selected service industries, manufacturing, and construction industries were canvassed for the first time in the Northern Mariana Islands in 1983 (for 1982).

For 1982, the economic censuses and agriculture censuses were conducted concurrently.

USES OF THE ECONOMIC CENSUSES

The economic censuses are the major source for facts about the structure and functioning of the Nation's economy and provide essential information for government, business, industry, and the general public. They provide an important part of the framework for such composite measures as the gross national product, input-output measures, indexes of industrial production, and indexes measuring productivity and price levels. Information from the censuses is used to establish sampling frames and as benchmarks for current surveys of business activity, which are essential for measuring short-term economic conditions.

State and local governments use census data to assess business activities within their jurisdictions. The private sector uses the data to forecast general economic conditions; analyze sales performance; lay out sales territories; allocate funds for advertising; decide on locations for new plants, warehouses, or stores; and measure potential markets in terms of size, geographic areas, kinds of business, and kinds of products made or sold.

Following every census, thousands of businesses and other users purchase reports. Likewise, census facts are disseminated widely by trade associations, business journals, and newspapers. Volumes containing census statistics are available in most major public and college libraries. All 1982 data are available on microfiche from the U.S. Government Printing Office and most data on computer tape from the Census Bureau. Finally, the more than 50 State Data Centers also are suppliers of economic census statistics.

AUTHORITY AND SCOPE OF THE ECONOMIC CENSUSES

The economic censuses are required by law under title 13 of the United States Code, sections 131, 191, and 224, which directs that they be taken at 5-year intervals for the years ending in 2 and 7. The 1982 Economic Censuses covered manufacturing, mining, construction industries, retail trade, wholesale trade, service industries, and selected transportation activities. Special programs also cover minority-owned and women-owned businesses. The next economic censuses are scheduled to be taken in 1988 for the year 1987.

¹Standard Industrial Classification Manual: 1972. For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 041-001-00066-6. 1977 Supplement. Stock No. 003-00500176-0.

CENSUS OF MANUFACTURES

General

The 1982 Census of Manufactures is the 31st census of manufactures of the United States. For 1982, it was conducted jointly with the censuses of mineral industries, construction industries, retail and wholesale trades, service industries, selected transportation activities, and minority-owned and women-owned businesses.

This report, from the 1982 Census of Manufactures, is one of a series of 82 industry reports, each of which provides statistics for groups of related industries. Additional separate reports will be issued for each State and on special subjects, such as size of establishments, legal form of organization, and fuels and electric energy consumed.

These separate reports will subsequently be issued as portions of the final census volumes. Volume I, Subject Statistics, will show comparative statistics for industries, States, and standard metropolitan statistical areas. It also will show selected subjects, such as concentration ratios in manufacturing, selected materials consumed, manufacturing activity in government establishments, and water use in manufacturing. Volume II, Industry Statistics, will be a consolidation of reports for the 82 groups of industries showing the same information that is shown in this report. Volume III, Geographic Area Statistics, will contain establishment-based data (number of establishments, employment, payroll, value added by manufacture, and capital expenditures) for each State and its important standard metropolitan statistical areas, counties, and places, by industry groups and important individual industries. Totals for "all manufacturing" will be shown for counties and places with more than 450 manufacturing employees. The introduction to the final volumes will discuss, at greater length, many of the subjects described in this introduction. For example, the volume text will discuss the relationship of value added by manufacture to National income by industry of origin, the changes in statistical concepts over the history of the censuses, and the valuation problems arising from intracompany transfers between manufacturing plants of a company and between manufacturing plants and sales offices and sales branches of a company.

Scope of Census and Definition of Manufacturing Industries

The 1982 Census of Manufactures covers all establishments employing one person or more primarily engaged in manufacturing as defined in the 1972 Standard Industrial Classification (SIC) Manual and its 1977 Supplement.¹ This is the system of industrial classification developed over a period of years by experts on classification in government and private industry under the guidance of the Office of Management and Budget. This system of classification is in general use among government agencies as well as organizations outside the government.

The SIC manual defines manufacturing as the mechanical or chemical transformation of inorganic or organic substances into new products. The assembly of component parts of products is also considered to be manufacturing if the resulting product is neither a structure nor other fixed improvement. These activities are usually carried on in plants, factories, or mills that characteristically use power-driven machines and materials handling equipment.

¹Standard Industrial Classification Manual: 1972. For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 041-001-00066-6. 1977 Supplement. Stock No. 003-00500176-0.

IV INTRODUCTION

Manufacturing production is usually carried on for the wholesale market, for transfers to other plants of the same company, or to the order of industrial users rather than for direct sale to the household consumer. Some manufacturers in a few industries sell chiefly at retail to household consumers through the mail, through house-to-house routes, or through sales persons. Some activities of a service nature (enameling, engraving, etc.) are included in manufacturing when they are performed primarily for the trade. They are considered nonmanufacturing when they are performed primarily to the order of the household consumer.

Relationship Between Annual Survey of Manufactures and Census of Manufactures

The Bureau of the Census conducts the annual survey of manufactures (ASM) in each of the 4 years between the censuses of manufactures. The ASM is based on a scientifically selected sample of approximately 55,000 establishments and collects the same industry statistics (employment, payroll, value of shipments, etc.) as the census of manufactures. In addition to collecting the information normally requested on the census form, the establishments in the ASM sample are requested to supply detailed information on assets, capital expenditures, retirements, depreciation, rental payments, supplemental labor costs, and costs of purchased services.

Establishment Basis of Reporting

The census of manufactures and the annual survey of manufactures are conducted on an establishment basis. A company operating at more than one location is required to file a separate report for each location. Companies engaged in distinctly different lines of activity at one location are requested to submit separate reports if the plant records permit such a separation and if the activities are substantial in size.

In 1982, as in earlier years, a minimum size limit was set for including establishments in the census. All establishments employing one person or more at any time during the census year are included. The same size limitation has applied since 1947 in censuses and annual surveys of manufactures. In the 1939 and earlier censuses, establishments with less than \$5,000 value of products were excluded. The change in the minimum size limit in 1947 does not appreciably affect the historical comparability of the census figures except for data on number of establishments for a few industries.

This report excludes information for separately operated administrative offices, warehouses, garages, and other auxiliary units that service manufacturing establishments of the same company (see Auxiliaries).

Manufacturing Universe and Census Report Forms

The 1982 Census of Manufactures universe includes approximately 345,000 establishments. The amounts of information requested from manufacturing establishments were dependent upon a number of factors. The more important considerations were the size of the company and whether it was included in the annual survey of manufactures. The methods of obtaining information for the various subsets of the universe to arrive at the aggregate figures shown in this publication are described below.

1. Small Single-Unit Companies Not Sent a Report Form

In the 1982 Census of Manufactures, approximately 140,000 small single-establishment companies were excluded from filing reports. Selection of these small

establishments was done on an industry-by-industry basis and was based on annual payroll and total shipments data as well as on the industry classification codes contained in the administrative records of other Federal agencies. The cutoffs were selected so that these administrative records cases would account for no more than 3 percent of the value of shipments for the industry. Generally, all single-establishment companies with less than 5 employees were excused, while all establishments with more than 20 employees were mailed report forms.

Information on the physical location of the establishment, as well as information on payrolls, receipts (shipments), and industry classification, was obtained from the administrative records of other Federal agencies under special arrangements, which safeguarded their confidentiality. Estimates of data for these small establishments were developed using industry averages in conjunction with the administrative information. The value of shipments and cost of materials were not distributed among specific products and materials for these establishments but were included in the product and material "not specified by kind" (n.s.k.) categories.

The industry classification codes included in the administrative records files were assigned on the basis of brief descriptions of the general activity of the establishment. As a result, an indeterminate number of establishments were erroneously coded to the four-digit SIC level. This was especially true whenever there was a relatively fine line of demarcation between industries or between manufacturing and nonmanufacturing activity.

Sometimes these administrative record cases were given only a two- or three-digit SIC group. For the 1982 Census of Manufactures, these establishments were sent a separate classification form, which requested information on the products and services of the establishment. This form was used to code many of these establishments to the four-digit SIC level. Establishments that did not return the classification form were coded later to those four-digit SIC industries identified as "not elsewhere classified" (n.e.c.) within the given two- or three-digit industry groups.

As a result of these situations, a number of small establishments may have been misclassified by industry. However, such possible misclassifications have no significant effect on the statistics other than on the number of establishments.

The total establishment count for individual industries should be viewed as an approximation rather than a precise measurement. The counts for establishments with 20 employees or more are far more reliable than the count of total number of establishments.

2. Establishments Sent a Report Form

The 205,000 establishments covered in the mail canvass were divided into three groups:

a. **ASM sample establishments**—This group consisted of approximately 55,000 establishments covering all the units of large manufacturing establishments as well as a sample of the medium and smaller establishments. The probability of selection was proportionate to size (see appendix, Annual Survey of Manufactures).

In a census of manufactures year, the ASM report form (MA-1000) replaces the first page of the regular census form for those establishments included in the ASM. In addition to information on employment, payroll,

and other items normally requested on the regular census form, establishments in the ASM sample were requested to supply information on assets, capital expenditures, retirements, depreciation, rental payments, supplemental labor costs, and costs of purchased services. Results of the ASM inquiries are included in tables 3c and 3d of this report.

The census part of the report form is one of approximately 200 versions containing product, material, and special inquiries. The diversity of manufacturing activities necessitated the use of this many forms to canvass the approximately 450 manufacturing industries. Each form was developed for a group of related industries.

Appearing on each form was a list of products primary to the group of related industries, as well as secondary products and miscellaneous services that establishments classified in these industries were likely to be performing. Respondents were requested to identify the products, the value of each product, and, in a large number of cases, the quantity of the product shipped during the survey year. Space was also provided for the respondent to describe products not specifically identified on the form.

The report form also contained a materials-consumed inquiry, which varied from form to form depending on the industries being canvassed. The respondents were asked to review a list of materials generally used in their production processes. From this list, each establishment was requested to identify those materials consumed during the survey year, the cost of each, and, in certain cases, the quantity consumed. Once again, space was provided for the respondent to describe significant materials not identified on the form.

Finally, a wide variety of special inquiries was included to measure activities peculiar to a given industry, such as operations performed and equipment used.

b. **Large and medium establishments (non-ASM)**—Approximately 100,000 establishments were included in this group. A variable cutoff, based on administrative records payroll data and determined on an industry-by-industry basis, was used to select those establishments that were to receive one of the approximately 200 census of manufactures regular forms. The first page, requesting establishment data for items such as employment and payroll, was standard but did not contain the detailed statistics included on the ASM form. The product, material, and special inquiry sections supplied were based on the historical industry classification of the establishment.

c. **Small single-unit establishments (non-ASM)**—This group consisted of approximately 50,000 establishments. For those industries where application of the variable cutoff for administrative records cases resulted in a large number of small establishments being included in the mail canvass, an abbreviated or "short" form was used. These establishments received one of the approximately 80 versions of the short form, which requested summary product and material data and totals but no details on employment, payrolls, cost of materials, inventories, and capital expenditures.

Use of the short form has no adverse effect on published totals for the industry statistics; the same

data were collected on the short as well as the long form. However, detailed information on materials consumed was not collected on the short form; thus its use would increase the values of the n.s.k. categories.

Auxiliaries

In this industry report, the data on employment and payroll are limited to operating manufacturing establishments. The census report form filed for auxiliaries (ES-9200) requested a description of the activity of the establishments serviced. However, the auxiliaries were coded only to the two-digit major group of the establishments they served; whereas, the operating establishments were coded to a four-digit manufacturing industry. Data for the approximately 10,000 separately operated auxiliaries are included in the paperbound geographic area series, the bound volumes of the census of manufactures, and in a report issued as part of the 1982 Enterprise Statistics survey.

Auxiliaries are establishments whose employees are primarily engaged in performing supporting services for other establishments of the same company, rather than for the general public or for other business firms. They can be at different locations from the establishments served or at the same location as one of those establishments but not operating as an integral part thereof and serving two or more establishments. Where auxiliary operations are conducted at the same location as the manufacturing operation and operate as an integral part thereof, they usually are included in the report for the operating manufacturing establishment.

Included in the broad category of auxiliaries are administrative offices. Employees in administrative offices are concerned with the general management of multiestablishment companies, i.e., with the general supervision and control of two units or more, such as manufacturing plants, mines, sales branches, or stores. The functions of these employees may include (1) program planning, including sales research and coordination of purchasing, production, and distribution; (2) company purchasing, including general contracts and purchasing methods; (3) company financial policy and accounting, tax accounting, company sales and profit reports, and personnel accounting; (4) general engineering, including design of product machinery and equipment, and direction of engineering effort conducted at the individual operation locations; (5) direction of company personnel matters; and (6) legal and patent matters.

Other types of auxiliaries serving the plants or central management of the company include purchasing offices, sales promotion offices, research and development organizations, etc.

Industry Classification of Establishments

Each of the establishments covered in the census was classified in one of approximately 450 manufacturing industries in accordance with the industry definitions in the SIC system. Under this system of classification, an industry is generally defined as a group of establishments producing a single product or a closely related group of products. The product groupings from which industry classifications are derived are based on considerations such as similarity of manufacturing processes, types of materials used, types of customers, and the like. The resulting group of plants must be significant in terms of its number, value added by manufacture, value of shipments, and number of employees. The system operates in such a way that the definitions progressively became narrower with successive additions of numerical digits. There are 20 major groups (two-digit SIC), 143 industry groups (three-digit SIC), and approximately 450

industries (four-digit SIC). The product classes and products of the manufacturing industries have been assigned codes based on the industry from which they originate. There are about 1,500 classes of products, identified by a five-digit code, and about 11,000 products, identified by a seven-digit code. The seven-digit products are considered the primary products of the industry with the same four digits.

Accordingly, an establishment is usually classified in a particular industry on the basis of its major activity during a particular year, i.e., production of the products primary to that industry exceeds, in value, production of the products primary to any other single industry. In a few instances, however, the industry classification of an establishment is not only determined by the products it makes but also by the process employed in making those products. For example, establishments engaged in blast furnace operations, refining of nonferrous metals from ore, or rolling and drawing of nonferrous metals (processes which involve heavy capitalization in specialized equipment) would be classified according to the process used during a census year. These establishments then would be "frozen" in that industry during the following ASM years.

In either a census or ASM year, establishments included in the ASM sample with certainty weight, other than those involved with heavily capitalized activities described above, are reclassified by industry only if the change in the primary activity from the prior year is significant or the change has occurred for two successive years. This procedure prevents reclassification when there are minor shifts in product mix.

In ASM years, establishments included in the ASM sample with noncertainty weight are not shifted from one industry classification to another. They are retained in the industry where they were classified in the base census year (see appendix, Annual Survey of Manufactures). However, in the following census year, these ASM plants are allowed to shift from one industry to another.

The result of these rules covering the switching of plants from one industry classification to another is that, at the aggregate level, some industries comprise different mixes of establishments between survey years, and establishment data for such industry statistics as employment and payroll may be tabulated in different industries between survey years. Hence, comparisons between prior-year and current-year published totals, particularly at the four-digit SIC level, should be viewed with caution. This is true particularly for the comparison between the data shown for a census year versus the data shown for the previous ASM year.

As previously noted, the small establishments that may have been misclassified by industry are usually administrative-record cases whose industry codes were assigned on the basis of incomplete descriptions of the general activity of the establishment. Such possible misclassifications have no significant effect on the statistics other than on the number of establishments.

While some establishments produce only the primary products of the industry in which they are classified, all establishments of an industry rarely specialize to this extent. The industry statistics (employment, inventories, value added by manufacture, total value of shipments including resales and miscellaneous receipts, etc.) shown in tables 1a through 5a, therefore, reflect not only the primary activities of the establishments in that industry but also their secondary activities. The product statistics in tables 6a through 6c represent the output of all establishments whether or not they are classified in the same industry as the product. For this reason, in relating the industry statistics, especially the value of shipments to the product statistics, the

composition of the industry's output shown in table 5b should be considered.

The extent to which industry and product statistics may be matched with each other is measured by two ratios, which are computed from the figures shown in table 5b. The first of these ratios, called the primary product specialization ratio, measures the proportion of product shipments (both primary and secondary) of the establishments classified in the industry represented by the primary products of those establishments. The second ratio, called the coverage ratio, is the proportion of primary products shipped by the establishments classified in the industry to total shipments of such products by all manufacturing establishments.

However, establishments making products falling into the same industry category may use a variety of processes and materials to produce them. Also, the same industry classification (based on end products) may include both establishments that are highly integrated and those that put only the finishing touches on an already highly fabricated item. For example, the refrigeration industry includes instances of almost complete integration (production of the compressor, condensing unit, electric motor, casting, stamping of the case, and final assembly) all carried on at one plant. On the other hand, the condensing unit, the motor, and the case may be purchased and only assembled into the finished product.

In some instances, separate industry categories have been established for integrated and nonintegrated establishments. For other industries, the census provides separate statistics on the production of intermediate commodities made and used in the producing plant. For some industries characterized by many plants of the same company, separate figures on interplant transfer of products usually are shown.

Differences in the integration of production processes, types of operations, and alternatives in types of materials used should be considered when relating the industry statistics (employment, payrolls, value added, etc.) to the product and material data.

Value of Shipments for the Industry Compared With Value of Product Shipments

This industry report shows value of shipments data for industries and products. In tables 1a through 5a, these data represent the total value of shipments of all establishments classified in the particular industry. The data include the shipments of the products classified in the industry (primary to the industry), products classified in other industries (secondary to the industry), and miscellaneous receipts (repair work, sale of scrap, research and development, installation receipts, and resales). Product shipments shown in table 6a represent the total value of shipments of products classified as primary to an industry that were shipped by all manufacturing establishments regardless of their industry classification.

CENSUS DISCLOSURE RULES

In accordance with Federal law governing census reports, no data are published that would disclose the data for an individual establishment or company. However, the number of establishments classified in a specific industry is not considered disclosure, so this item may be given even though other information is withheld.

MANUFACTURES—INDUSTRY SERIES

The disclosure analysis for the industry statistics in tables 1a through 5a of this report is based on the total value of shipments. When the total value of shipments cannot be shown without disclosing information for individual companies, the complete line has been suppressed. However, the suppressed data are included in higher level totals. Additional disclosure analysis is performed for new capital expenditures that can be suppressed even though value of shipments data are publishable.

MICROFICHE AND COMPUTER TAPES

All the data in this report are available on microfiche. Selected data are also available on computer tape.

In addition to selected published data being on computer tape, one major data series, the location of manufacturing plants, will be available only on computer tape. This series presents the number of establishments by employment size class by four-digit SIC industry codes for States, counties, and places of 2,500 inhabitants or more. These data are available for both State and county by industry, and State and place by industry.

Microfiche reports are sold by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Computer tapes are sold by the Data User Services Division, Customer Services (Tapes), Bureau of the Census, Washington, D.C. 20233.

SPECIAL TABULATIONS

Special tabulations of data collected in the 1982 Census of Manufactures may be obtained on computer tape or in tabular form. The data will be in summary form and subject to the same rules prohibiting disclosure of confidential information (including name, address, kind of business, or other data for individual business establishments or companies) as are the regular publications.

Special tabulations are prepared on a cost basis. A request for a cost estimate, as well as exact specifications on the type and format of the data to be provided, should be directed to the Chief, Industry Division, Bureau of the Census, Washington, D.C. 20233.

ABBREVIATIONS AND SYMBOLS

The following abbreviations and symbols are used in this publication:

- Represents zero.
- (D) Withheld to avoid disclosing data for individual companies; data are included in higher level totals.
- (NA) Not available.
- (NC) Not comparable.
- (S) Withheld because estimate did not meet publication standards on the basis of either the response rate or a consistency review.
- (X) Not applicable.
- (Z) Less than half the unit shown.
- n.e.c. Not elsewhere classified.
- n.s.k. Not specified by kind.
- pt. Part.
- r Revised.
- SIC Standard Industrial Classification.

Other abbreviations, such as lb, gal, yd, doz, bbl, and s tons, are used in the customary sense.

Users' Guide for Locating Statistics

[For explanation of terms, see appendixes]

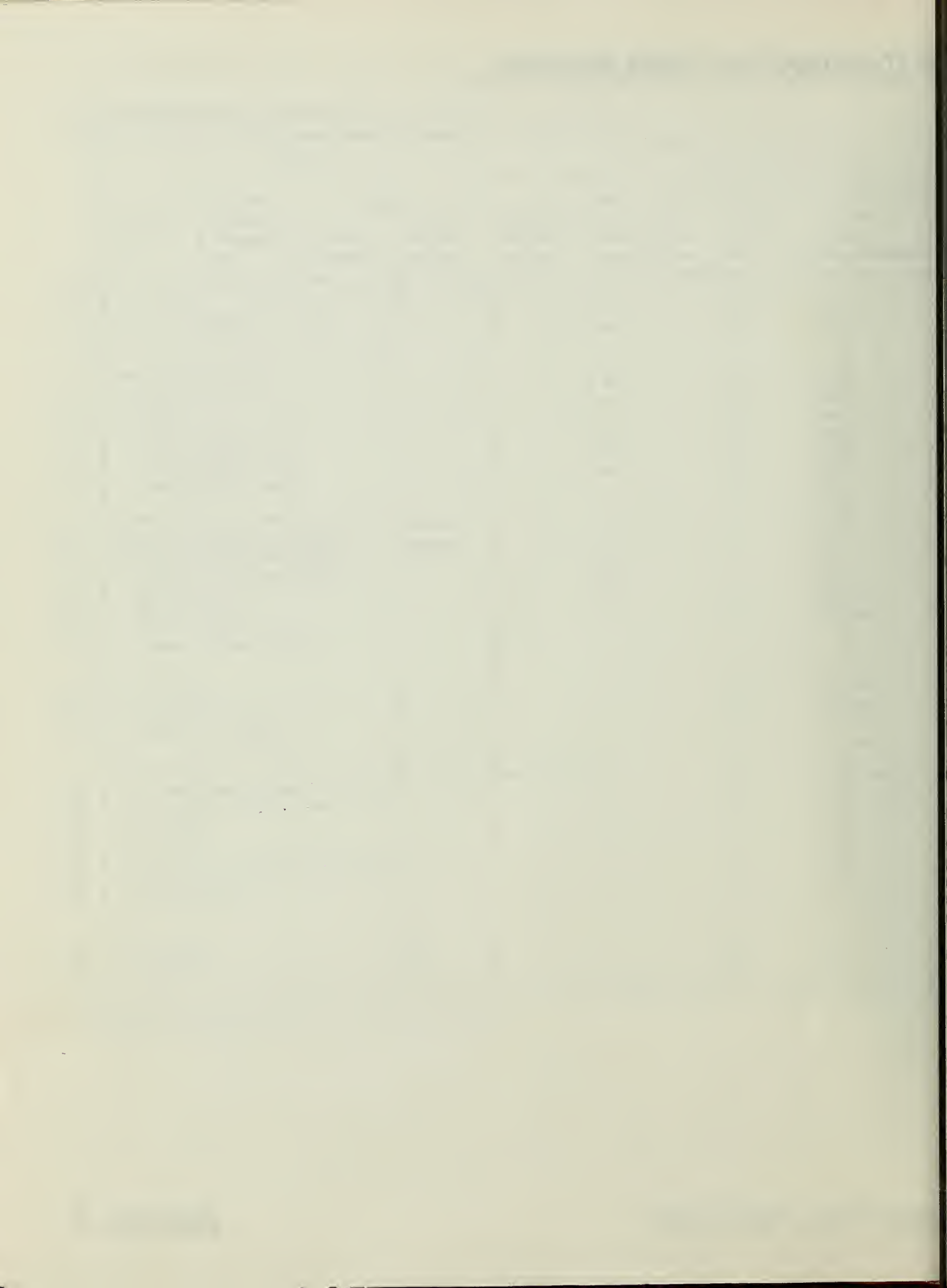
	Item	Four-digit industry statistics		
		Historical	Operating ratios	By geographic area
1	Number of companies	1a		
2	Number of manufacturing establishments	1a		2
	Employment and payroll:			
3	Number of employees	1a	1b	2
4	Payroll	1a	1b	2
5	Supplemental labor costs			
6	Production workers	1a	1b	2
7	Production-worker hours	1a	1b	2
8	Production-worker wages	1a	1b	2
	Shipments, cost of materials, and value added:			
9	Value of shipments (four-digit)	1a	1b	2
10	Product class shipments (five-digit)			
11	Product shipments (seven-digit)			
12	Value added by manufacture	1a	1b	2
13	Cost of materials	1a	1b	2
14	Fuels and electric energy			
15	Materials consumed by kind			
	Inventories:			
16	Total, end of year	1a		
17	By method of valuation			
18	By stage of fabrication			
	Capital expenditures, assets, rental payments, and purchased services:			
19	New capital expenditures	1a		2
20	Used plant and equipment expenditures			
21	Gross assets			
22	Depreciation			
23	Retirements of buildings and machinery			
24	Rental payments			
25	Purchased services			
	Ratios:			
26	Specialization	1a		
27	Coverage	1a		

*Number of companies with shipments of over \$100 thousand.

**Detailed information shown.

In This Report by Table Number

Four-digit industry statistics—Con.				Five-digit product class and seven-digit product statistics				
Summary and supplemental	By employment size	By industry and product class specialization	Materials consumed by kind	Industry-product analysis	Product shipments	Product class by geographic area	Historical product class	
3a					* 6a			1
** 3a	4	5a						2
3a	4	5a						3
3a	4	5a						4
** 3d								5
** 3a	4	5a						6
** 3a	4	5a						7
3a	4	5a						8
3a	4	5a		5b, 5c				9
				5b, 5c	6a	6b	6c	10
					6a			11
3a	4	5a						12
** 3a	4	5a						13
3a, 3d			7					14
								15
3b, 3c	4							16
3b, 3c								17
3b								18
** 3a, ** 3d	4	5a						19
** 3a, ** 3d								20
** 3d								21
** 3d								22
** 3d								23
** 3d								24
** 3d								25
3a				5b				26
3a				5b				27



Electrical Measurement and Distribution Equipment

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DESCRIPTION OF INDUSTRIES AND SUMMARY OF FINDINGS

ELECTRICAL MEASUREMENT AND DISTRIBUTION EQUIPMENT

This report shows 1982 Census of Manufactures statistics for establishments classified in each of the following industries:

SIC Code and Title

3612	Transformers
3613	Switchgear and Switchboard Apparatus
3621	Motors and Generators
3622	Industrial Controls
3623	Welding Apparatus, Electric
3624	Carbon and Graphite Products
3629	Electrical Industrial Apparatus, N.E.C.

The industry statistics (employment, payroll, cost of materials, value of shipments, inventories, etc.) are reported for each establishment as a whole. Aggregates of such data for an industry reflect not only the primary activities of the establishments but also their activities in the manufacture of secondary products as well as their miscellaneous activities (contract work on materials owned by others, repair work, etc.). This fact should be taken into account in comparing industry statistics (tables 1a-5a) with product statistics (table 6a) showing shipments by all industries of the primary products of the specified industry. The extent of the "product mix" is indicated in table 5b, which shows the value of primary and secondary products shipped by establishments classified in the specified industry and the value of primary products of the industry shipped as secondary products by establishments classified in other industries.

Small single-unit companies with up to 20 employees (cutoff varied by industry) were excluded from the mail portion of the census. For these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated), data on payrolls and receipts were obtained from administrative records of other government agencies. The remaining statistics were developed from industry averages.

Establishment data were tabulated based on industry definitions contained in the 1972 Standard Industrial Classification (SIC) Manual and its 1977 supplement.¹

INDUSTRY 3612, TRANSFORMERS

This industry comprises establishments primarily engaged in the manufacture of power distribution, instrument, and specialty transformers. Establishments primarily engaged in the manufacture of radio frequency or voice frequency transformers, coils,

or chokes are classified in industry 3677, and resistance welder transformers in industry 3623.

In the 1982 Census of Manufactures, Industry 3612, Transformers, recorded employment of 39.0 thousand. The total value of shipments for establishments classified in this industry was \$2,916 million.

The value of shipments figure shown above is in current (1982) prices. All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The employment figure shown above was 10 percent below the 43.3 thousand reported in 1977. The leading States in employment in 1982 were Wisconsin, Pennsylvania, Massachusetts, and Illinois, accounting for approximately 39 percent of the industry's 1982 employment. Data for Pennsylvania and Massachusetts have been withheld to avoid disclosing data for individual companies. These same States were the leaders in 1977, when they accounted for approximately 40 percent of the industry's employment, although there has been some shift in the relative importance of individual States.

Compared with 1981, employment decreased 15 percent. The 1981 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. In current prices, industry 3612 shipped \$2,669 million of products primary to the industry, \$179 million of secondary products, and had \$68 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 94 percent (specialization ratio). In 1977, this specialization ratio was 95 percent.

Establishments in this industry also accounted for 96 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1977, the coverage ratio was 97 percent. The products primary to industry 3612, no matter in what industry they were produced, appear in table 6a and aggregate to \$2,773 million in current prices.

The total cost of materials and services used by establishments classified in the transformers industry amounted to \$1,422 million in current prices. Data on specific materials consumed appear in table 7.

The establishments in this industry with less than 10 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 5 percent of total value of shipments.

¹Standard Industrial Classification Manual: 1972. For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 041-001-00066-6. 1977 Supplement. Stock No. 003-005-00176-0.

INDUSTRY 3613, SWITCHGEAR AND SWITCHBOARD APPARATUS

This industry comprises establishments primarily engaged in the manufacture of switchgear and switchboard apparatus. Important products of this industry include power switches, circuit breakers, power switching equipment, and similar switchgear for general industrial application; switchboards and cubicles, control and metering panels, power fuse mountings; and similar switchboard apparatus and supplies. Establishments primarily engaged in the manufacture of industrial controls are classified in industry 3622, and those manufacturing current-carrying wiring devices in industry 3643.

In the 1982 Census of Manufactures, Industry 3613, Switchgear and Switchboard Apparatus, recorded employment of 66.0 thousand. The total value of shipments for establishments classified in this industry was \$5,173 million.

The value of shipments figure shown above is in current (1982) prices. All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The employment figure shown above was 8 percent below the 71.4 thousand reported in 1977. The leading States in employment in 1982 were Pennsylvania, Illinois, California, and Connecticut, accounting for approximately 39 percent of the industry's 1982 employment. Data for Pennsylvania and Connecticut have been withheld to avoid disclosing data for individual companies. This represents a shift from 1977 when Pennsylvania, California, Illinois, and New Jersey accounted for approximately 45 percent of the industry's employment.

Compared with 1981, employment decreased 7 percent. The 1981 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. In current prices, industry 3613 shipped \$4,415 million of products primary to the industry, \$444 million of secondary products, and had \$314 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 91 percent (specialization ratio). In 1977, this specialization ratio also was 91 percent.

Establishments in this industry also accounted for 93 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1977, the coverage ratio was 91 percent. The products primary to industry 3613, no matter in what industry they were produced, appear in table 6a and aggregate to \$4,761 million in current prices.

The total cost of materials and services used by establishments classified in the switchgear and switchboard apparatus industry amounted to \$1,947 million in current prices. Data on specific materials consumed appear in table 7.

The establishments in this industry with less than 10 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These

establishments accounted for 7 percent of total value of shipments.

INDUSTRY 3621, MOTORS AND GENERATORS

This industry comprises establishments primarily engaged in the manufacture of electric motors (except starting motors) and power generators; motor generator sets; railway motors and control equipment; and motors, generators, and control equipment for gasoline, electric, and oil-electric buses and trucks. Establishments primarily engaged in the manufacture of turbo-generators are classified in industry 3511, and starting motors and battery charging generators for internal combustion engines in industry 3694.

In the 1982 Census of Manufactures, Industry 3621, Motors and Generators, recorded employment of 84.1 thousand. The total value of shipments for establishments classified in this industry was \$6,058 million.

The value of shipments figure shown above is in current (1982) prices. All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The employment figure shown above was 13 percent below the 96.9 thousand reported in 1977. The leading States in employment in 1982 were Ohio, New York, Wisconsin, and Arkansas, accounting for approximately 40 percent of the industry's 1982 employment. Data for Arkansas have been withheld to avoid disclosing data for individual companies. This represents a shift from 1977 when New York, Ohio, Indiana, and Arkansas accounted for approximately 32 percent of the industry's employment.

Compared with 1981, employment decreased 10 percent. The 1981 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. In current prices, industry 3621 shipped \$5,456 million of products primary to the industry, \$337 million of secondary products, and had \$265 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 94 percent (specialization ratio). In 1977, this specialization ratio was 92 percent.

Establishments in this industry also accounted for 81 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1977, the coverage ratio was 80 percent. The products primary to industry 3621, no matter in what industry they were produced, appear in table 6a and aggregate to \$6,725 million in current prices.

The total cost of materials and services used by establishments classified in the motors and generators industry amounted to \$2,526 million in current prices. Data on specific materials consumed appear in table 7.

The establishments in this industry with less than 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These

establishments accounted for 4 percent of total value of shipments.

INDUSTRY 3622, INDUSTRIAL CONTROLS

This industry comprises establishments primarily engaged in the manufacture of motor starters and controllers; control accessories, electronic controls, and other industrial controls. Establishments primarily engaged in the manufacture of automatic temperature controls are classified in industry 3822, and industrial process instruments in industry 3823.

In the 1982 Census of Manufactures, Industry 3622, Industrial Controls, recorded employment of 63.6 thousand. The total value of shipments for establishments classified in this industry was \$4,277 million.

The value of shipments figure shown above is in current (1982) prices. All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The employment figure shown above was 16 percent above the 55.5 thousand reported in 1977. The leading States in employment in 1982 were Wisconsin, California, Illinois, and Virginia, accounting for approximately 40 percent of the industry's 1982 employment. Data for Virginia have been withheld to avoid disclosing data for individual companies. This represents a shift from 1977 when Wisconsin, Illinois, Ohio, and North Carolina accounted for approximately 49 percent of the industry's employment.

Compared with 1981, employment decreased 5 percent. The 1981 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. In current prices, industry 3622 shipped \$3,817 million of products primary to the industry, \$287 million of secondary products, and had \$228 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 93 percent (specialization ratio). In 1977, this specialization ratio was 87 percent.

Establishments in this industry also accounted for 87 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1977, the coverage ratio was 86 percent. The products primary to industry 3622, no matter in what industry they were produced, appear in table 6a and aggregate to \$4,376 million in current prices.

The total cost of materials and services used by establishments classified in the industrial controls industry amounted to \$1,666 million in current prices. Data on specific materials consumed appear in table 7.

The establishments in this industry with less than 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 11 percent of total value of shipments.

INDUSTRY 3623, WELDING APPARATUS, ELECTRIC

This industry comprises establishments primarily engaged in the manufacture of electric welding apparatus and accessories. Establishments primarily engaged in coating welding wire from purchased wire or from wire drawn in the same establishment are also included. Establishments primarily engaged in the manufacture of gas welding apparatus are classified in industry 3549; and laser, electron beam, and ultrasonic welding machines and equipment in industry 3662.

In the 1982 Census of Manufactures, Industry 3623, Welding Apparatus, Electric, recorded employment of 15.0 thousand. The total value of shipments for establishments classified in this industry was \$1,353 million.

The value of shipments figure shown above is in current (1982) prices. All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The employment figure shown above was 14 percent below the 17.5 thousand reported in 1977. The leading States in employment in 1982 were Ohio, Michigan, Wisconsin, and Pennsylvania, accounting for approximately 60 percent of the industry's 1982 employment. Data for Wisconsin have been withheld to avoid disclosing data for individual companies. These same States were the leaders in 1977, when they accounted for approximately 49 percent of the industry's employment.

Compared with 1981, employment decreased 14 percent. The 1981 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. In current prices, industry 3623 shipped \$1,163 million of products primary to the industry, \$150 million of secondary products, and had \$40 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 89 percent (specialization ratio). In 1977, this specialization ratio was 86 percent.

Establishments in this industry also accounted for 94 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1977, the coverage ratio also was 94 percent. The products primary to industry 3623, no matter in what industry they were produced, appear in table 6a and aggregate to \$1,232 million in current prices.

The total cost of materials and services used by establishments classified in the welding apparatus, electric industry amounted to \$644 million in current prices. Data on specific materials consumed appear in table 7.

The establishments in this industry with less than 10 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 7 percent of total value of shipments.

INDUSTRY 3624, CARBON AND GRAPHITE PRODUCTS

This industry comprises establishments primarily engaged in the manufacture of lighting carbons; carbon, graphite, and metal graphite brushes and brush stock; carbon or graphite electrodes for thermal and electrolytic uses; and other carbon, graphite, and metal graphite products.

In the 1982 Census of Manufactures, Industry 3624, Carbon and Graphite Products, recorded employment of 12.1 thousand. The total value of shipments for establishments classified in this industry was \$980 million.

The value of shipments figure shown above is in current (1982) prices. All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The employment figure shown above was the same as the 12.1 thousand reported in 1977. The leading States in employment in 1982 were Pennsylvania, New York, Ohio, and North Carolina, accounting for approximately 60 percent of the industry's 1982 employment. Data for North Carolina have been withheld to avoid disclosing data for individual companies. These same States were the leaders in 1977, when they also accounted for approximately 60 percent of the industry's employment.

Compared with 1981, employment decreased 7 percent. The 1981 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. In current prices, industry 3624 shipped \$840 million of products primary to the industry, \$54 million of secondary products, and had \$86 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 94 percent (specialization ratio). In 1977, this specialization ratio also was 94 percent.

Establishments in this industry also accounted for 93 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1977, the coverage ratio was also 93 percent. The products primary to industry 3624, no matter in what industry they were produced, appear in table 6a and aggregate to \$901 million in current prices.

The total cost of materials and services used by establishments classified in the carbon and graphite products industry amounted to \$467 million in current prices. Data on specific materials consumed appear in table 7.

The establishments in this industry with less than 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 5 percent of total value of shipments.

INDUSTRY 3629, ELECTRICAL INDUSTRIAL APPARATUS, N.E.C.

This industry comprises establishments primarily engaged in the manufacture of industrial and commercial electric apparatus and equipment, not elsewhere classified, such as blasting machines, and fixed and variable capacitors, condensers, and rectifiers for industrial applications. Establishments primarily engaged in the manufacture of condensers, capacitors, and rectifiers for electronic end products are classified in industry group 367.

In the 1982 Census of Manufactures, Industry 3629, Electrical Industrial Apparatus, N.E.C., recorded employment of 16.3 thousand. The total value of shipments for establishments classified in this industry was \$1,111 million.

The value of shipments figure shown above is in current (1982) prices. All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The employment figure shown above was 1 percent below the 16.5 thousand reported in 1977. The leading States in employment in 1982 were California, New York, Ohio, and Indiana, accounting for approximately 55 percent of the industry's 1982 employment. Data for New York have been withheld to avoid disclosing data for individual companies. This represents a shift from 1977 when Ohio, New York, Illinois, and Indiana accounted for approximately 32 percent of the industry's employment.

Compared with 1981, employment decreased 3 percent. The 1981 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. In current prices, industry 3629 shipped \$926 million of products primary to the industry, \$142 million of secondary products, and had \$50 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 87 percent (specialization ratio). In 1977, this specialization ratio was also 87 percent.

Establishments in this industry also accounted for 92 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1977, the coverage ratio was 81 percent. The products primary to industry 3629, no matter in what industry they were produced, appear in table 6a and aggregate to \$1,003 million in current prices.

The total cost of materials and services used by establishments classified in the electrical industrial apparatus, n.e.c., industry amounted to \$456 million in current prices. Data on specific materials consumed appear in table 7.

The establishments in this industry with less than 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 19 percent of total value of shipments.

Table 1a. Historical Statistics for the Industry: 1982 and Earlier Years

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year ¹	All establishments ³			All employees		Production workers			Value added by manufacture ⁴ (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories ⁴ (million dollars)	Ratios	
	Companies ² (no.)	Total (no.)	With 20 employees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						Specialization (percent)	Coverage (percent)
INDUSTRY 3612, TRANSFORMERS															
1982 Census	244	293	162	39.0	732.1	28.5	51.3	461.0	1 439.0	1 421.8	2 916.0	76.5	536.6	94	96
1981 ASM	(NA)	(NA)	(NA)	45.9	771.7	34.4	65.5	502.1	1 578.1	1 665.7	3 208.8	80.5	513.1	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	44.9	705.2	33.7	65.7	468.4	1 440.6	1 500.5	2 957.4	83.6	456.0	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	46.6	649.1	35.9	68.0	437.8	1 414.6	1 351.3	2 728.7	72.6	470.9	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	44.6	596.0	34.0	63.9	395.6	1 280.7	1 193.7	2 451.6	63.0	419.6	(NA)	(NA)
1977 Census	229	279	143	43.3	529.6	32.8	62.5	349.8	1 162.7	1 061.8	2 201.8	67.2	385.8	95	97
1976 ASM	(NA)	(NA)	(NA)	38.8	437.4	28.9	53.2	285.1	939.7	872.9	1 812.0	32.6	326.4	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	40.3	444.7	29.7	56.2	290.4	916.6	854.6	1 805.2	35.2	321.9	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	49.6	500.6	38.4	75.3	353.7	1 006.4	1 009.5	1 974.5	47.2	385.6	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	50.7	466.4	39.8	78.4	326.4	890.2	804.0	1 663.1	36.4	319.6	(NA)	(NA)
1972 Census	168	216	136	46.8	420.2	35.6	71.3	286.1	757.3	700.5	1 461.9	26.8	258.7	96	97
1971 ASM	(NA)	(NA)	(NA)	45.7	389.1	34.1	66.6	256.9	723.7	644.6	1 376.0	27.2	265.3	(NA)	(NA)
1970 ASM	(NA)	(NA)	(NA)	49.3	394.4	37.6	73.9	265.6	767.2	658.8	1 392.7	53.3	279.8	(NA)	(NA)
1969 ASM	(NA)	(NA)	(NA)	47.3	363.4	35.7	72.5	238.5	743.1	592.3	1 352.6	46.4	250.9	(NA)	(NA)
1968 ASM	(NA)	(NA)	(NA)	47.6	349.8	35.5	72.9	230.9	750.6	559.8	1 315.9	44.2	258.8	(NA)	(NA)
1967 Census	150	190	122	45.6	317.6	34.0	68.5	210.1	678.9	531.8	1 189.2	52.8	240.3	95	98
INDUSTRY 3613, SWITCHGEAR AND SWITCHBOARD APPARATUS															
1982 Census	512	646	334	66.0	1 256.7	44.5	83.4	716.3	3 133.0	1 947.2	5 172.8	142.6	1 049.2	91	93
1981 ASM	(NA)	(NA)	(NA)	70.9	1 259.1	49.3	95.4	744.8	3 248.3	1 934.6	5 135.0	138.5	1 011.6	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	72.3	1 165.6	50.0	97.0	693.8	2 994.4	1 991.7	4 934.0	130.2	951.1	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	76.4	1 102.9	54.4	105.3	687.1	2 764.3	1 795.0	4 474.8	117.3	854.0	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	75.1	1 001.1	54.2	104.2	621.6	2 455.1	1 648.3	4 054.6	90.2	755.6	(NA)	(NA)
1977 Census	541	667	315	71.4	896.1	51.7	99.1	556.8	2 151.8	1 429.8	3 541.0	73.1	647.5	91	91
1976 ASM	(NA)	(NA)	(NA)	65.3	755.9	45.9	85.6	462.1	1 761.8	1 144.6	2 876.0	52.6	568.7	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	64.7	709.2	44.5	82.5	428.5	1 575.3	1 046.3	2 660.9	33.9	526.3	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	73.2	743.7	53.2	104.0	474.5	1 629.6	1 102.3	2 668.7	57.3	591.2	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	74.4	704.0	53.8	107.1	446.7	1 514.2	994.9	2 461.9	48.1	504.2	(NA)	(NA)
1972 Census	463	568	283	69.2	619.8	49.6	97.1	388.5	1 303.0	844.2	2 123.5	36.9	413.1	91	89
1971 ASM	(NA)	(NA)	(NA)	65.6	566.0	46.5	92.3	353.0	1 212.6	774.8	1 997.8	34.9	401.4	(NA)	(NA)
1970 ASM	(NA)	(NA)	(NA)	67.4	546.1	48.0	95.7	343.3	1 159.5	748.1	1 886.9	38.7	396.5	(NA)	(NA)
1969 ASM	(NA)	(NA)	(NA)	67.5	513.8	48.8	98.3	321.1	1 137.3	713.3	1 831.5	46.0	377.2	(NA)	(NA)
1968 ASM	(NA)	(NA)	(NA)	64.7	465.5	46.4	93.4	289.2	1 010.8	665.4	1 669.1	41.7	326.2	(NA)	(NA)
1967 Census	398	482	283	68.5	488.0	49.7	100.5	304.9	1 030.3	669.7	1 690.0	39.1	338.2	89	90
INDUSTRY 3621, MOTORS AND GENERATORS															
1982 Census	348	471	324	84.1	1 545.7	61.0	114.3	983.7	3 434.3	2 525.9	6 058.1	275.4	1 087.6	94	81
1981 ASM	(NA)	(NA)	(NA)	93.4	1 608.5	70.3	137.0	1 089.3	3 634.7	2 747.4	6 316.4	235.8	1 049.4	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	94.1	1 478.9	69.6	136.6	987.9	3 119.1	2 503.3	5 648.2	183.2	984.8	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	107.1	1 512.1	81.7	161.1	1 036.8	3 279.7	2 552.4	5 728.3	176.9	1 035.4	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	106.1	1 370.3	82.0	160.2	941.5	2 963.4	2 281.6	5 185.5	176.7	896.6	(NA)	(NA)
1977 Census	340	446	298	96.9	1 176.7	74.1	149.7	802.1	2 609.9	1 915.9	4 458.7	160.9	770.3	92	80
1976 ASM	(NA)	(NA)	(NA)	90.7	1 009.1	70.7	137.2	691.7	2 194.8	1 601.8	3 726.5	131.5	638.1	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	82.0	850.9	60.6	118.7	567.6	1 719.4	1 364.1	3 137.2	94.3	547.5	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	100.2	957.7	77.7	152.5	654.1	1 923.6	1 553.0	3 383.3	117.9	679.1	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	100.6	900.8	79.0	156.9	630.0	1 720.6	1 295.0	2 989.0	85.3	565.1	(NA)	(NA)
1972 Census	325	426	258	90.3	764.4	69.2	139.3	516.9	1 475.2	1 054.8	2 501.7	58.9	466.8	91	81
1971 ASM	(NA)	(NA)	(NA)	93.7	783.6	70.1	140.0	516.2	1 389.5	1 059.3	2 472.0	104.7	483.1	(NA)	(NA)
1970 ASM	(NA)	(NA)	(NA)	103.9	814.8	78.3	154.2	543.8	1 459.9	1 061.4	2 468.9	103.2	495.0	(NA)	(NA)
1969 ASM	(NA)	(NA)	(NA)	109.4	820.3	82.7	169.0	555.5	1 472.1	1 079.5	2 541.8	100.1	486.8	(NA)	(NA)
1968 ASM	(NA)	(NA)	(NA)	109.4	780.0	82.6	168.0	522.5	1 436.3	1 005.9	2 436.0	94.1	463.1	(NA)	(NA)
1967 Census	320	409	279	112.8	764.6	85.3	172.3	514.4	1 430.8	977.5	2 402.3	102.5	457.4	83	83
INDUSTRY 3622, INDUSTRIAL CONTROLS															
1982 Census	853	914	408	64.1	1 282.1	34.4	65.4	560.0	2 605.2	1 666.2	4 331.1	178.9	1 052.8	93	87
1981 ASM	(NA)	(NA)	(NA)	67.2	1 245.6	39.5	75.6	601.6	2 768.5	1 690.4	4 445.6	173.5	941.5	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	67.2	1 118.1	41.3	80.5	572.0	2 498.3	1 580.3	4 014.6	153.7	940.1	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	64.6	972.5	41.2	81.0	526.0	2 247.5	1 327.2	3 475.2	103.2	821.1	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	62.7	877.9	38.9	75.4	454.6	1 944.5	1 195.0	3 117.3	118.4	722.3	(NA)	(NA)
1977 Census	675	727	284	55.5	727.5	35.4	69.1	380.6	1 604.2	963.3	2 514.6	57.6	616.8	87	86
1976 ASM	(NA)	(NA)	(NA)	56.4	682.2	36.9	70.3	376.9	1 422.0	925.0	2 326.2	55.7	559.2	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	57.1	646.0	36.4	69.3	352.3	1 273.9	843.2	2 133.4	41.6	529.5	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	63.9	661.8	43.6	86.0	389.9	1 346.1	875.6	2 172.4	48.1	535.3	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	57.2	556.1	38.4	76.0	307.8	1 097.7	688.7	1 729.9	36.2	413.3	(NA)	(NA)
1972 Census	544	588	216	51.1	465.6	33.4	66.6	257.1	908.4	555.4	1 424.1	46.8	331.8	79	84
1971 ASM	(NA)	(NA)	(NA)	45.1	395.1	29.0	55.2	213.9	738.8	408.0	1 156.9	27.1	246.7	(NA)	(NA)
1970 ASM	(NA)	(NA)	(NA)	48.1	394.9	30.8	59.6	213.8	768.9	407.7	1 170.8	31.2	264.9	(NA)	(NA)
1969 ASM	(NA)	(NA)	(NA)	55.2	425.2	36.7	73.1	237.4	814.1	428.8	1 228.2	67.4	272.8	(NA)	(NA)
1968 ASM	(NA)	(NA)	(NA)	51.9	373.6	27.8	66.3	207.9	721.9						

Table 1a. Historical Statistics for the Industry: 1982 and Earlier Years—Con.

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year ¹	Companies ² (no.)	All establishments ³		All employees		Production workers			Value added by manufacture ⁴ (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories ⁴ (million dollars)	Ratios	
		Total (no.)	With 20 employees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						Specialization (percent)	Coverage (percent)
INDUSTRY 3623, WELDING APPARATUS, ELECTRIC—Con.															
1972 Census	154	166	80	15.5	173.9	9.8	20.9	102.5	353.5	314.2	659.6	11.4	149.3	84	92
1971 ASM	(NA)	(NA)	(NA)	12.7	140.3	7.6	16.5	75.8	261.5	243.7	503.6	5.0	123.5	(NA)	(NA)
1970 ASM	(NA)	(NA)	(NA)	14.3	143.9	9.0	18.6	79.7	255.7	251.6	509.8	10.0	115.2	(NA)	(NA)
1969 ASM	(NA)	(NA)	(NA)	15.0	146.6	9.8	20.6	88.7	276.4	250.6	526.1	⁵ 16.3	102.5	(NA)	(NA)
1968 ASM	(NA)	(NA)	(NA)	13.8	128.4	9.4	19.2	77.1	251.9	226.8	486.4	15.4	91.4	(NA)	(NA)
1967 Census	133	147	92	13.7	118.4	9.4	19.8	72.9	265.3	237.8	493.3	18.1	98.5	91	94
INDUSTRY 3624, CARBON AND GRAPHITE PRODUCTS															
1982 Census	71	91	60	12.1	260.7	8.5	16.8	165.9	554.9	467.4	980.4	151.9	601.9	94	93
1981 ASM	(NA)	(NA)	(NA)	13.0	256.8	9.6	19.2	171.2	799.3	717.1	1 360.6	144.8	484.9	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	13.3	241.9	9.7	19.4	166.0	661.0	544.5	1 183.3	86.4	291.5	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	13.3	223.8	10.0	20.2	157.8	644.2	524.5	1 145.2	43.1	259.7	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	12.5	183.3	9.5	18.8	128.7	499.1	393.7	890.6	33.5	222.5	(NA)	(NA)
1977 Census	58	74	48	12.1	164.1	9.0	17.7	110.9	408.4	337.5	735.2	35.4	215.9	94	93
1978 ASM	(NA)	(NA)	(NA)	12.0	152.8	8.9	16.8	102.2	399.3	339.1	691.4	63.3	211.4	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	11.3	128.5	8.3	15.6	86.4	375.1	244.9	594.2	61.1	154.0	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	12.6	134.9	9.6	19.3	96.6	342.5	278.5	613.0	22.1	123.8	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	12.2	115.8	9.5	19.2	84.6	264.5	190.3	452.5	20.0	102.7	(NA)	(NA)
1972 Census	58	72	44	11.3	99.6	8.6	16.7	70.9	217.4	158.2	377.4	20.2	98.4	95	98
1971 ASM	(NA)	(NA)	(NA)	11.1	92.7	8.4	16.5	66.0	218.7	144.2	359.0	17.6	91.3	(NA)	(NA)
1970 ASM	(NA)	(NA)	(NA)	12.0	96.4	9.2	18.5	69.4	245.5	139.6	372.0	15.4	88.7	(NA)	(NA)
1969 ASM	(NA)	(NA)	(NA)	11.3	86.3	8.8	17.2	62.1	207.5	123.5	333.4	15.6	72.9	(NA)	(NA)
1968 ASM	(NA)	(NA)	(NA)	11.3	79.7	8.7	17.2	56.9	182.5	113.7	293.7	22.5	71.3	(NA)	(NA)
1967 Census	49	65	42	11.9	82.8	9.1	18.5	57.8	186.3	117.8	296.4	41.3	69.4	96	96
INDUSTRY 3629, ELECTRICAL INDUSTRIAL APPARATUS, N.E.C.															
1982 Census	309	323	120	16.3	280.4	11.3	21.5	154.5	644.7	456.3	1 111.3	29.3	230.9	87	92
1981 ASM	(NA)	(NA)	(NA)	16.8	282.6	12.1	24.6	157.4	653.6	536.5	1 179.9	38.3	234.8	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	18.1	265.0	12.8	25.3	154.4	621.9	470.1	1 083.0	43.1	210.8	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	19.6	253.9	14.5	27.7	156.7	580.8	418.7	982.7	30.4	201.5	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	19.7	232.7	14.8	28.2	145.1	496.9	367.3	851.5	24.4	167.9	(NA)	(NA)
1977 Census	214	223	102	16.5	188.6	12.2	23.4	113.4	411.0	294.0	692.4	16.8	140.0	87	81
1976 ASM	(NA)	(NA)	(NA)	19.6	203.0	14.2	27.1	132.1	417.9	301.6	706.9	19.3	156.1	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	17.4	166.0	12.3	24.4	96.6	329.2	257.0	593.9	17.4	140.7	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	22.5	193.9	16.6	32.7	120.8	397.3	298.7	683.8	15.9	177.2	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	23.7	199.0	16.9	34.5	115.1	340.4	310.0	634.0	21.8	127.7	(NA)	(NA)
1972 Census	245	258	121	20.2	165.0	13.5	26.0	89.4	270.0	187.4	449.4	11.2	99.2	85	80
1971 ASM	(NA)	(NA)	(NA)	20.5	158.7	13.4	25.6	79.3	276.3	151.2	438.3	10.6	89.7	(NA)	(NA)
1970 ASM	(NA)	(NA)	(NA)	19.0	131.5	14.2	27.1	82.1	245.1	167.2	409.9	9.6	94.0	(NA)	(NA)
1969 ASM	(NA)	(NA)	(NA)	20.5	140.5	15.3	30.4	88.4	259.2	189.9	445.6	10.1	91.2	(NA)	(NA)
1968 ASM	(NA)	(NA)	(NA)	20.2	129.2	15.4	29.9	84.6	253.1	179.6	428.6	10.3	85.8	(NA)	(NA)
1967 Census	212	219	123	17.9	103.7	14.0	27.4	69.2	188.3	141.3	328.8	12.3	71.3	84	67

¹In annual survey of manufactures (ASM) years, data are estimates based on a representative sample of establishments canvassed annually and may differ from results of a complete canvass of all establishments. ASM publication shows percentage standard errors. Unless otherwise noted, for data prior to 1967, see 1967 Census of Manufactures, vol. II, table 1 of the Industry chapter.

²For the census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.

³Includes establishments with payroll at any time during year.

⁴Effective with the 1982 Economic Censuses, uniform instructions for reporting inventories were introduced for all sector reports. Up to 1982, respondents were permitted to value inventories using any generally accepted accounting method (FIFO, LIFO, market, to name a few). In 1982, LIFO users were asked to first report inventory values prior to the LIFO adjustment and then to report the LIFO reserve and the LIFO value after adjustment for the reserve.

Because of this change in reporting instructions, the 1982 data for inventories and value added by manufacture included in the tables of this report are not comparable to the prior-year data shown above and in historical census of manufactures and annual survey of manufactures publications. Inventories and value added data estimated on a basis comparable to the historical data, using the reported information for 1982, are shown below:

Industries	End-of-1981 inventories (million dollars)	End-of-1982 inventories (million dollars)	1982 value added by manufacture (million dollars)
Industry 3612, Transformers	444.4	390.1	1 464.2
Industry 3613, Switchgear and switchboard apparatus	914.4	835.5	3 161.5
Industry 3621, Motors and generators	994.1	868.3	3 463.2
Industry 3822, Industrial controls	1 041.4	964.5	2 611.8
Industry 3623, Welding apparatus, electric	305.1	280.0	697.0
Industry 3624, Carbon and graphite products	504.4	519.7	546.7
Industry 3629, Electrical industrial apparatus, n.e.c.	212.2	198.5	651.9

See Inventories in appendixes for explanation of the difference between end-of-1981 inventory figure shown in table and corresponding figure shown in footnote.

⁵Estimate for new capital expenditures has associated standard error of 15 percent or more and may be of limited reliability. Estimates for other data items are of acceptable reliability.

Table 1b. Selected Operating Ratios for the industry: 1982 and Earlier Years

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year	Payroll per employee (dollars)	Production workers as percent of total employment (percent)	Annual hours of production workers (number)	Average hourly earnings of production workers (dollars)	Cost of materials as percent of value of shipments (percent)	Cost of materials and payroll as percent of value of shipments (percent)	Value added per employee (dollars)	Payroll as percent of value added (percent)	Value added per production worker hour (dollars)
INDUSTRY 3612, TRANSFORMERS									
1982 Census	18 772	73	1 800	8.99	49	74	38 897	51	28.05
1981 ASM	16 813	75	1 904	7.67	52	76	34 381	49	24.09
1980 ASM	15 706	75	1 950	7.13	51	75	32 085	49	21.93
1979 ASM	13 929	77	1 894	8.44	50	73	30 356	46	20.80
1978 ASM	13 363	76	1 879	6.19	49	73	28 715	47	20.04
1977 Census	12 231	78	1 905	5.60	48	72	27 021	45	18.72
1976 ASM	11 273	74	1 841	5.36	48	72	24 219	47	17.66
1975 ASM	11 035	74	1 892	5.17	47	72	22 744	49	16.31
1974 ASM	10 093	77	1 961	4.70	51	78	20 290	50	13.37
1973 ASM	9 199	79	1 970	4.16	48	76	17 558	52	11.35
1972 Census	8 879	76	2 003	4.01	48	77	16 182	55	10.62
1971 ASM	8 514	75	1 953	3.86	47	75	15 836	54	10.87
1970 ASM	8 000	76	1 965	3.59	47	78	15 562	51	10.38
1969 ASM	7 683	75	2 031	3.29	44	71	15 710	49	10.25
1968 ASM	7 349	75	2 054	3.17	43	69	15 769	47	10.30
1967 Census	6 965	75	2 015	3.07	45	71	14 888	47	9.91
INDUSTRY 3613, SWITCHGEAR AND SWITCHBOARD APPARATUS									
1982 Census	19 041	87	1 874	8.59	38	62	47 470	40	37.57
1981 ASM	17 759	70	1 935	7.81	38	62	45 815	39	34.05
1980 ASM	18 122	89	1 940	7.15	40	64	41 416	39	30.87
1979 ASM	14 436	71	1 938	6.53	40	65	36 182	40	26.25
1978 ASM	13 330	72	1 923	5.97	41	65	32 691	41	23.56
1977 Census	12 524	72	1 917	5.61	40	66	30 082	42	21.68
1976 ASM	11 576	70	1 865	5.40	40	66	26 980	43	20.58
1975 ASM	10 961	69	1 854	5.19	39	66	24 348	45	19.09
1974 ASM	10 180	73	1 955	4.56	41	69	22 262	46	15.87
1973 ASM	9 462	72	1 991	4.17	40	69	20 352	48	14.14
1972 Census	8 957	72	1 958	4.00	40	89	18 829	48	13.42
1971 ASM	8 828	71	1 985	3.82	39	6	18 485	47	13.14
1970 ASM	8 102	71	1 994	3.59	40	69	17 203	47	12.12
1969 ASM	7 812	72	2 014	3.27	39	87	16 849	45	11.57
1968 ASM	7 195	72	2 013	3.10	40	68	15 623	46	10.82
1967 Census	7 124	73	2 022	3.03	40	69	15 041	47	10.25
INDUSTRY 3621, MOTORS AND GENERATORS									
1982 Census	18 379	73	1 874	8.61	42	67	40 836	45	30.05
1981 ASM	17 222	75	1 949	7.95	43	69	38 915	44	26.53
1980 ASM	15 716	74	1 963	7.23	44	71	33 147	47	22.83
1979 ASM	14 119	76	1 972	6.44	45	71	30 623	46	20.36
1978 ASM	12 915	77	1 954	5.88	44	70	27 930	46	18.50
1977 Census	12 153	77	1 965	5.50	43	69	26 933	45	17.90
1976 ASM	11 126	78	1 941	5.04	43	70	24 198	46	16.00
1975 ASM	10 377	74	1 959	4.78	43	71	20 968	49	14.49
1974 ASM	9 558	78	1 963	4.29	46	74	19 198	50	12.61
1973 ASM	8 954	79	1 986	4.02	43	73	17 103	52	10.97
1972 Census	8 465	77	2 013	3.71	42	73	18 337	52	10.59
1971 ASM	8 363	75	1 997	3.69	43	75	14 829	56	9.92
1970 ASM	7 842	75	1 969	3.53	43	76	14 051	56	9.47
1969 ASM	7 498	76	2 044	3.29	42	75	13 456	56	8.71
1968 ASM	7 130	76	2 034	3.11	41	73	13 129	54	8.55
1967 Census	6 778	76	2 020	2.99	41	73	12 684	53	8.30
INDUSTRY 3622, INDUSTRIAL CONTROLS									
1982 Census	20 002	54	1 901	8.56	38	68	40 643	49	39.83
1981 ASM	18 538	59	1 914	7.96	38	66	41 198	45	36.62
1980 ASM	18 638	61	1 949	7.11	39	67	37 177	45	31.03
1979 ASM	15 054	64	1 966	6.49	38	66	34 791	43	27.75
1978 ASM	14 002	62	1 938	6.03	38	66	31 013	45	25.79
1977 Census	13 118	64	1 955	5.51	38	67	28 921	45	23.22
1976 ASM	12 096	65	1 905	5.36	40	69	25 213	48	20.23
1975 ASM	11 313	64	1 904	5.08	40	70	22 310	51	18.38
1974 ASM	10 357	68	1 972	4.53	40	71	21 066	49	15.85
1973 ASM	9 722	67	1 979	4.05	40	72	19 191	51	14.44
1972 Census	9 112	65	1 994	3.86	39	72	17 777	51	13.64
1971 ASM	8 781	64	1 903	3.88	35	69	16 381	53	13.38
1970 ASM	8 210	64	1 935	3.59	35	89	15 985	51	12.90
1969 ASM	7 703	66	1 992	3.25	35	70	14 748	52	11.14
1968 ASM	7 198	54	2 385	3.14	35	68	13 909	52	10.89
1967 Census	6 962	69	2 000	3.03	35	67	14 304	49	10.36
INDUSTRY 3623, WELDING APPARATUS, ELECTRIC									
1982 Census	22 720	67	1 780	11.51	48	73	45 613	50	38.44
1981 ASM	24 314	87	2 085	10.34	55	79	45 966	53	32.97
1980 ASM	20 921	65	2 009	9.89	54	78	39 500	53	30.44
1979 ASM	19 388	63	2 050	8.75	53	77	39 090	50	30.12
1978 ASM	17 754	85	2 016	7.99	53	77	35 059	51	26.65
1977 Census	18 326	65	2 035	7.18	53	77	33 297	49	25.33
1976 ASM	14 708	68	1 981	6.59	52	76	29 932	49	22.95
1975 ASM	14 012	65	2 027	6.33	51	73	30 088	47	22.94
1974 ASM	13 018	68	2 098	5.63	52	75	28 731	45	20.27
1973 ASM	11 870	67	2 148	5.19	50	76	23 086	51	16.12

See footnotes at end of table.

Table 1b. Selected Operating Ratios for the Industry: 1982 and Earlier Years—Con.

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year	Payroll per employee (dollars)	Production workers as percent of total employment (percent)	Annual hours of production workers (number)	Average hourly earnings of production workers (dollars)	Cost of materials as percent of value of shipments (percent)	Cost of materials and payroll as percent of value of shipments (percent)	Value added per employee (dollars)	Payroll as percent of value added (percent)	Value added per production worker hour (dollars)
INDUSTRY 3623, WELDING APPARATUS, ELECTRIC—Con.									
1972 Census	11 219	63	2 133	4.90	48	74	22 806	49	16.91
1971 ASM	11 047	60	2 171	4.59	48	76	20 591	54	15.85
1970 ASM	10 063	63	2 067	4.28	49	78	17 881	56	13.75
1969 ASM	9 773	65	2 102	4.31	48	75	18 427	53	13.42
1968 ASM	9 304	68	2 043	4.02	47	73	18 254	51	13.12
1967 Census	8 642	69	2 106	3.68	48	72	19 365	45	13.40
INDUSTRY 3624, CARBON AND GRAPHITE PRODUCTS									
1982 Census	21 545	70	1 976	9.88	48	74	45 860	47	33.03
1981 ASM	19 754	74	2 000	8.92	53	72	61 485	32	41.63
1980 ASM	18 188	73	2 000	8.56	46	66	49 699	37	34.07
1979 ASM	16 827	75	2 020	7.81	46	65	48 436	35	31.89
1978 ASM	14 664	76	1 979	6.85	44	65	39 928	37	26.55
1977 Census	13 562	74	1 967	6.27	46	68	33 752	40	23.07
1976 ASM	12 733	74	1 888	6.08	49	71	33 275	38	23.77
1975 ASM	11 372	73	1 880	5.54	41	63	33 195	34	24.04
1974 ASM	10 706	76	2 010	5.01	45	67	27 183	39	17.75
1973 ASM	9 492	78	2 021	4.41	42	68	21 680	44	13.78
1972 Census	8 814	76	1 942	4.25	42	68	19 239	46	13.02
1971 ASM	8 351	76	1 964	4.00	40	66	19 703	42	13.25
1970 ASM	8 033	77	2 011	3.75	38	63	20 458	39	13.27
1969 ASM	7 637	78	1 955	3.61	37	63	18 363	42	12.06
1968 ASM	7 053	77	1 977	3.31	39	66	16 150	44	10.61
1967 Census	6 958	76	2 033	3.12	40	68	15 655	44	10.07
INDUSTRY 3629, ELECTRICAL INDUSTRIAL APPARATUS, N.E.C.									
1982 Census	17 202	69	1 903	7.19	41	66	39 552	43	29.99
1981 ASM	16 821	72	2 033	6.40	45	69	38 905	43	26.57
1980 ASM	14 641	71	1 977	6.10	43	68	34 359	43	24.58
1979 ASM	12 954	74	1 910	5.66	43	68	29 633	44	20.97
1978 ASM	11 812	75	1 905	5.15	43	70	25 223	47	17.62
1977 Census	11 430	74	1 918	4.85	42	70	24 909	46	17.56
1976 ASM	10 357	72	1 908	4.87	43	71	21 321	49	15.42
1975 ASM	9 540	71	1 984	3.96	43	71	18 920	50	13.49
1974 ASM	8 618	74	1 970	3.69	44	72	17 658	49	12.15
1973 ASM	8 397	71	2 041	3.34	49	80	14 363	58	9.87
1972 Census	8 168	67	1 926	3.44	42	78	13 366	61	10.38
1971 ASM	7 741	65	1 910	3.10	34	71	13 478	57	10.79
1970 ASM	6 921	75	1 908	3.03	41	73	12 900	54	9.04
1969 ASM	6 854	75	1 987	2.91	43	74	12 644	54	8.53
1968 ASM	6 396	76	1 942	2.83	42	72	12 530	51	8.46
1967 Census	5 793	78	1 957	2.53	43	75	10 520	55	6.87

Note: For qualifications of data, see footnotes on table 1a.

Table 2. Industry Statistics for Selected States: 1982 and 1977

[Excludes data for auxiliaries. Includes data for States with 150 employees or more. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and geographic area	1982												1977	
	E¹	All establishments²		All employees		Production workers			Value added by manufacture⁴ (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	All employees³ (1,000)	Value added by manufacture (million dollars)
		Total (no.)	With 20 employees or more (no.)	Number³ (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						
INDUSTRY 3612, TRANSFORMERS														
United States	-	293	162	39.0	732.1	28.5	51.3	461.0	1 439.0	1 421.8	2 918.0	76.5	43.3	1 162.7
Alabama	-	3	3	.5	9.3	.5	.8	7.4	7.4	26.6	34.2	.8	.7	18.2
Arkansas	-	5	4	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
California	E1	56	20	2.6	44.3	1.7	3.5	27.0	93.4	86.6	187.3	6.1	1.6	50.4
Connecticut	E1	5	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Florida	-	8	3	.8	11.7	.6	1.0	7.4	24.0	24.5	48.4	.9	BB	(D)
Georgia	-	5	4	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
Illinois	-	28	14	3.0	51.6	2.3	3.3	32.1	118.3	143.7	262.8	5.9	3.7	77.3
Indiana	-	7	6	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Iowa	-	2	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Kentucky	-	3	3	.6	8.8	.4	.7	5.2	16.9	40.5	58.8	.2	1.4	29.7
Louisiana	-	2	1	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Massachusetts	E1	7	4	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
Michigan	E1	8	5	.4	6.2	.3	.5	4.6	11.8	10.7	23.0	(D)	.4	8.9
Minnesota	-	4	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Mississippi	-	6	4	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
Missouri	-	5	4	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	1.4	45.5
New Jersey	E2	23	12	1.6	24.5	1.4	2.6	15.5	35.1	48.0	87.3	2.4	1.7	27.2
New York	E2	22	10	1.2	18.3	.8	1.6	10.3	44.6	37.2	81.8	1.6	1.7	30.6
North Carolina	-	6	6	1.8	35.5	1.2	2.2	19.2	87.7	71.2	160.7	(D)	2.1	70.5
Ohio	-	12	8	1.0	18.1	.8	1.3	12.2	29.5	46.5	75.8	1.9	1.6	38.9

See footnotes at end of table.

Table 2. Industry Statistics for Selected States: 1982 and 1977—Con.

[Excludes data for auxiliaries. Includes data for States with 150 employees or more. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and geographic area	1982											1977		
	E¹	All establishments²		All employees		Production workers			Value added by manufacture⁴ (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	All employees³ (1,000)	Value added by manufacture (million dollars)
		Total (no.)	With 20 employees or more (no.)	Number³ (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						
INDUSTRY 3612, TRANSFORMERS—Con.														
Oregon	-	2	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Pennsylvania	-	11	6	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
Tennessee	-	6	5	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Texas	E1	15	6	.6	9.4	.5	.9	7.7	16.4	29.0	46.2	.9	.7	15.0
Virginia	-	10	5	1.2	23.8	.7	1.4	12.4	59.1	52.6	110.2	2.5	EE	(D)
Washington	-	3	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Wisconsin	-	14	14	4.4	82.6	3.2	4.8	49.7	152.2	170.0	324.6	6.4	4.2	114.2
INDUSTRY 3613, SWITCHGEAR AND SWITCHBOARD APPARATUS														
United States	-	648	334	66.0	1 256.7	44.5	83.4	718.3	3 133.0	1 947.2	5 172.8	142.6	71.4	2 191.8
Alabama	-	8	4	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Arkansas	E2	4	4	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
California	E1	78	40	5.0	90.4	3.2	6.2	49.6	192.7	176.9	376.1	18.9	4.8	138.7
Colorado	E1	6	5	.2	3.4	.1	.1	1.5	9.0	11.0	20.3	(D)	(NA)	(NA)
Connecticut	-	20	12	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
Florida	-	26	7	1.3	22.2	.8	1.5	10.8	56.7	27.0	96.9	2.6	(NA)	(NA)
Georgia	-	12	11	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Illinois	E1	64	37	6.4	127.5	4.1	8.2	68.7	269.3	167.7	442.3	13.4	7.4	173.8
Indiana	-	6	4	1.9	30.0	1.4	2.5	20.4	89.3	61.2	157.3	(D)	EE	(D)
Iowa	-	8	4	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Kentucky	-	12	9	2.9	51.1	2.2	3.9	32.4	169.0	51.9	222.1	6.4	3.8	115.7
Louisiana	-	11	6	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Maine	-	1	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Maryland	-	10	5	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Massachusetts	-	15	7	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Michigan	E2	33	12	1.0	18.7	.7	1.3	10.2	35.3	33.1	70.1	.7	1.1	33.5
Minnesota	E2	10	5	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.9	17.6
Mississippi	-	4	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Missouri	-	13	8	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	3.9	103.2
Nebraska	-	3	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
New Hampshire	-	5	4	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
New Jersey	E1	48	24	3.1	53.4	2.1	4.0	32.6	90.4	79.5	172.9	3.5	4.4	113.5
New Mexico	-	1	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
New York	E2	30	17	1.4	22.8	.9	1.7	12.2	47.0	45.6	93.0	1.5	1.6	40.7
North Carolina	-	21	9	2.7	39.7	2.1	3.8	26.1	139.8	100.1	236.8	7.4	2.2	66.8
Ohio	-	38	18	2.8	52.6	1.9	3.3	31.8	133.0	82.0	218.8	3.6	3.2	95.7
Oklahoma	-	7	4	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Oregon	E1	9	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Pennsylvania	-	34	20	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
South Carolina	-	9	6	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Tennessee	-	7	4	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Texas	-	36	17	2.1	42.0	1.5	2.7	24.8	87.6	116.3	203.3	7.5	1.5	44.9
Virginia	-	7	5	.8	13.7	.5	.8	6.6	31.6	26.9	59.4	1.8	CC	(D)
Washington	E1	12	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
West Virginia	-	3	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Wisconsin	-	16	7	1.3	25.9	.9	1.8	17.1	96.9	36.7	134.0	1.8	1.7	71.8
INDUSTRY 3621, MOTORS AND GENERATORS														
United States	-	471	324	84.1	1 545.7	61.0	114.3	983.7	3 434.3	2 525.9	8 058.1	275.4	96.9	2 606.9
Alabama	-	5	4	1.0	16.1	.8	1.3	10.7	58.1	33.3	88.2	5.6	.8	30.3
Arizona	-	4	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Arkansas	-	14	13	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
California	E1	49	27	3.1	65.2	2.2	4.0	34.4	162.3	100.0	263.2	6.7	4.4	134.1
Connecticut	-	9	5	2.2	36.6	1.3	2.3	16.8	68.9	59.0	130.6	2.5	1.7	35.8
Florida	E1	7	4	.3	4.1	.2	.4	2.7	7.5	12.9	21.3	.3	.2	9.8
Georgia	-	4	4	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Illinois	E1	40	30	4.3	70.9	3.2	6.3	44.7	151.9	124.8	281.4	6.8	4.0	82.3
Indiana	-	25	19	5.6	113.4	4.4	8.7	80.0	216.3	122.4	349.0	10.0	8.8	239.2
Iowa	-	5	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Kansas	-	3	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Kentucky	-	4	4	2.1	31.3	1.8	3.0	24.4	75.7	86.3	167.9	(D)	2.3	53.5
Louisiana	-	5	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Maryland	-	1	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Massachusetts	E6	9	3	.4	6.2	.2	.4	3.2	10.0	13.2	22.7	1.4	.2	4.6
Michigan	-	17	12	1.8	34.0	1.4	2.7	22.5	46.7	39.3	89.0	3.4	2.5	43.5
Minnesota	-	15	10	4.0	84.2	2.5	4.3	44.8	187.3	148.4	324.3	14.0	3.7	124.1
Mississippi	-	7	6	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
Missouri	-	16	13	4.7	70.8	3.9	7.1	54.0	188.0	163.1	355.3	21.9	5.5	131.1
New Hampshire	-	5	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.5	9.5
New Jersey	-	15	9	1.6	27.0	1.1	2.2	18.0	51.1	26.3	77.3	1.3	2.1	46.3
New York	-	28	16	8.4	199.8	6.2	11.7	137.7	441.8	287.6	743.0	45.6	11.8	426.7
North Carolina	-	10	10	1.7	26.4	1.2	2.4	16.0	70.4	44.7	119.3	30.5	1.7	32.5
Ohio	-	42	31	8.7	179.1	6.1	12.0	112.9	353.9	218.9	587.8	35.1	11.3	319.9
Oklahoma	-	6	6	.8	10.8	.5	.9	5.8	39.7	29.0	68.1	3.5	CC	(D)
Pennsylvania	-	29	23	5.3	107.6	3.4	6.9	53.8	263.8	180.9	454.6	10.5	5.2	167.4
South Carolina	-	2	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Tennessee	-	11	11	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
Texas	E1	11	8	1.4	26.0	.8	1.6	12.6	53.1	55.3	116.5	2.3	.5	11.6
Virginia	-	13	7	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Wisconsin	-	39	30	7.0	136.4	4.5	8.4	80.8	227.0	188.2	417.0	14.4	7.4	179.0

See footnotes at end of table.

Table 2. Industry Statistics for Selected States: 1982 and 1977—Con.

[Excludes data for auxiliaries. Includes data for States with 150 employees or more. For meaning of abbreviations and symbols, see Introductory text. For explanation of terms, see appendixes]

Industry and geographic area	1982												1977	
	All establishments ²		All employees		Production workers			Value added by manufacture ⁴ (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	All employees ³ (1,000)	Value added by manufacture (million dollars)	
	E ¹	Total (no.)	With 20 employees or more (no.)	Number ³ (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)							Wages (million dollars)
INDUSTRY 3622, INDUSTRIAL CONTROLS														
United States	E1	914	408	64.1	1 282.1	34.4	85.4	560.0	2 605.2	1 866.2	4 331.1	178.9	55.5	1 604.2
Alabama	E3	10	3	.2	3.5	.1	.2	1.6	6.4	5.2	11.8	.4	(NA)	(NA)
Arizona	E2	6	3	.2	3.9	.1	.2	2.2	7.3	4.4	12.2	(D)	AA	(D)
California	E1	124	52	5.5	105.3	2.9	5.8	43.6	234.6	121.1	349.9	11.1	2.7	69.0
Colorado	E1	12	5	.3	5.0	.1	.3	1.9	8.3	7.4	15.8	(D)	(NA)	(NA)
Connecticut	E2	34	19	1.2	22.1	.7	1.3	10.2	38.2	35.7	73.8	1.3	1.8	38.2
Florida	E1	25	11	1.3	22.2	.7	1.4	14.4	53.8	26.2	80.7	3.8	CC	(D)
Georgia	-	9	6	1.2	20.0	.7	1.4	10.2	51.0	59.8	113.7	(D)	CC	(D)
Illinois	E1	70	38	5.1	99.2	3.0	5.3	44.6	193.7	173.0	373.0	12.1	5.1	135.7
Indiana	E1	21	15	2.3	23.5	1.5	3.0	12.5	33.4	30.0	67.2	1.6	CC	(D)
Iowa	-	8	4	.7	10.8	.4	.9	5.9	29.7	11.6	42.5	(D)	BB	(D)
Kansas	E1	10	4	.2	3.0	.1	.1	1.2	5.5	3.9	9.0	.2	(NA)	(NA)
Kentucky	E1	4	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Maryland	-	8	4	1.5	26.7	.9	1.7	8.6	81.1	60.3	132.9	(D)	EE	(D)
Massachusetts	E2	43	17	3.8	79.6	1.8	3.6	30.3	155.6	75.9	235.2	12.2	2.1	50.0
Michigan	E1	66	24	2.5	57.1	1.2	2.5	23.1	80.7	73.5	159.4	4.8	2.3	59.9
Minnesota	E1	22	10	.7	15.5	.3	.5	5.0	20.8	15.7	37.0	1.8	1.0	26.3
Montana	-	2	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
New Hampshire	-	3	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
New Jersey	E3	43	19	1.3	22.9	.8	1.6	10.8	44.9	27.4	72.2	2.0	1.1	19.3
New York	E2	50	20	2.6	50.5	1.3	2.7	20.3	106.5	55.2	157.1	4.1	3.3	92.1
North Carolina	E1	15	9	4.1	75.3	2.7	4.7	41.3	231.1	120.4	354.5	14.7	3.4	133.1
Ohio	-	66	30	4.4	97.6	1.7	2.8	28.4	248.1	127.5	375.1	11.8	3.5	117.7
Oklahoma	E3	6	4	.3	4.6	.2	.4	2.9	6.4	8.3	15.9	.2	CC	(D)
Oregon	E6	10	2	.2	3.2	.1	.2	1.5	6.4	5.6	12.0	(D)	(NA)	(NA)
Pennsylvania	E1	59	28	3.1	51.2	1.7	3.3	23.4	85.0	70.6	159.4	6.5	2.2	59.1
South Carolina	-	10	5	1.1	18.8	.5	1.0	7.2	42.2	25.1	68.3	(D)	1.2	32.6
Tennessee	-	7	4	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Texas	E1	57	25	2.0	41.2	.9	1.9	15.2	79.1	76.4	155.8	6.6	1.1	28.3
Virginia	-	16	7	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
Washington	E4	17	5	.3	6.9	.1	.2	2.3	14.8	8.2	23.3	.8	.2	5.3
West Virginia	-	4	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Wisconsin	-	43	24	10.7	245.9	5.5	9.4	110.4	393.1	218.0	640.5	20.0	12.2	353.3
INDUSTRY 3623, WELDING APPARATUS, ELECTRIC														
United States	-	182	108	15.0	340.8	10.0	17.8	204.8	684.2	643.8	1 353.2	44.4	17.5	582.7
California	E2	28	13	1.2	25.3	.7	1.2	12.2	48.6	50.7	99.0	2.5	1.1	33.3
Connecticut	-	6	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Illinois	-	11	7	.6	12.0	.4	.7	6.9	17.4	23.6	43.3	.9	1.0	19.0
Indiana	E1	4	3	.3	6.6	.2	.4	4.3	17.4	16.6	31.8	.6	BB	(D)
Kansas	-	3	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Maryland	-	3	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Michigan	-	38	26	2.1	57.1	1.5	3.1	35.3	100.5	82.2	180.7	4.2	1.9	71.1
Missouri	E7	6	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
New York	-	9	4	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Ohio	-	20	12	4.4	116.9	3.4	5.5	80.9	262.4	217.9	488.8	12.6	5.2	211.7
Pennsylvania	-	10	8	1.2	24.2	.6	1.0	10.6	33.1	56.3	95.2	8.8	1.5	52.1
South Carolina	-	2	1	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Texas	E2	3	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Wisconsin	-	8	5	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
INDUSTRY 3624, CARBON AND GRAPHITE PRODUCTS														
United States	-	91	60	12.1	260.7	8.5	18.8	185.9	554.9	467.4	980.4	151.9	12.1	408.4
California	-	9	6	.3	6.0	.2	.4	2.9	16.7	8.0	25.9	.3	.2	9.3
Illinois	-	5	4	.3	5.4	.2	.3	2.8	9.4	6.5	16.0	.5	AA	(D)
Kentucky	E4	2	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Michigan	E5	7	4	.5	12.5	.4	.8	8.1	18.8	9.3	28.3	1.3	.6	18.5
New York	-	9	7	1.8	47.3	1.3	2.9	32.6	114.5	51.0	183.0	12.9	2.7	125.7
North Carolina	-	4	3	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Ohio	E3	13	11	1.2	25.1	.8	1.7	16.6	45.2	37.7	86.0	3.7	1.3	47.9
Pennsylvania	-	9	9	3.2	66.7	2.1	4.2	40.2	111.0	60.8	163.6	18.1	3.2	75.4
South Carolina	-	2	1	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Tennessee	-	2	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Texas	E6	5	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
West Virginia	-	2	1	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Wisconsin	E3	3	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)

See footnotes at end of table.

Table 2. Industry Statistics for Selected States: 1982 and 1977—Con.

[Excludes data for auxiliaries. Includes data for States with 150 employees or more. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and geographic area	1982										1977		
	All establishments ²		All employees		Production workers			Value added by manufacture ⁴ (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	All employees ³ (1,000)	Value added by manufacture (million dollars)
	E ¹	Total (no.)	With 20 employees or more (no.)	Number ³ (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)					
INDUSTRY 3629, ELECTRICAL INDUSTRIAL APPARATUS, N.E.C.													
United States	E1	323	120	16.3	280.4	11.3	21.5	154.5	644.7	456.3	1 111.3	29.3	411.0
Arizona	E1	8	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
California	-	70	22	3.3	56.0	2.2	4.5	28.4	116.8	72.5	191.2	3.3	49.0
Connecticut	-	10	6	.4	5.3	.3	.6	3.4	14.7	10.0	24.7	(D)	(D)
Florida	-	9	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Illinois	E2	23	12	1.0	14.4	.6	1.3	6.8	31.6	30.0	61.2	1.3	(D)
Indiana	-	10	8	1.4	25.3	1.0	1.7	16.1	46.5	40.1	89.6	4.0	57.5
Maryland	E1	4	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Massachusetts	-	12	4	.8	10.5	.6	1.2	6.5	23.6	20.1	43.8	(D)	26.4
Michigan	E2	12	4	.4	6.8	.3	.5	3.9	12.8	10.0	23.0	.4	7.7
Minnesota	-	8	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
New Jersey	E1	13	5	.3	4.5	.2	.4	2.2	7.9	5.1	13.3	.2	(D)
New York	-	20	8	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
North Carolina	-	5	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Ohio	-	16	8	1.9	36.6	1.2	2.2	17.4	97.4	47.5	149.6	4.6	97.8
Pennsylvania	-	20	8	.5	8.6	.3	.7	5.0	30.5	17.6	46.3	.4	19.1
South Carolina	-	2	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Texas	E6	21	5	.5	9.4	.3	.7	4.3	33.1	22.0	55.1	(D)	3.8
Vermont	-	3	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Virginia	-	5	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Wisconsin	E3	7	4	.3	3.6	.2	.3	2.0	7.4	7.1	14.2	.3	(NA)

Note: For qualifications of data, see footnotes on table 1a.

¹Payroll and sales data for some small single-unit companies with up to 20 employees (cutoff varied by industry) were obtained from administrative records of other government agencies rather than from census report forms. These data were then used in conjunction with industry averages to estimate the items shown for these small establishments. This technique was also used for a small number of other establishments whose reports were not received at time data were tabulated. The following symbols are shown for those States where estimated data based on administrative records data account for 10 percent or more of figures shown: E1—10 to 19 percent; E2—20 to 29 percent; E3—30 to 39 percent; E4—40 to 49 percent; E5—50 to 59 percent; E6—60 to 69 percent; E7—70 to 79 percent; E8—80 to 89 percent; E9—90 percent or more.

²Includes establishments with payroll at any time during year.

³Statistics for some producing States have been withheld to avoid disclosing data for individual companies. However, for States with 150 employees or more, number of establishments is shown and employment size range is indicated by one of the following symbols: AA—150 to 249 employees; BB—250 to 499 employees; CC—500 to 999 employees; EE—1,000 to 2,499 employees; FF—2,500 employees or more.

⁴Beginning in 1982, all respondents were requested to report their inventories at cost or market prior to adjustment to LIFO cost. This is a change from prior years in which respondents were permitted to value their inventories using any generally accepted accounting method. Consequently, data for inventories and value added by manufacture are not comparable to prior-year data.

Table 3a. Summary Statistics for the Industry: 1982

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Transformers (SIC 3612)	Switchgear and switchboard apparatus (SIC 3613)	Motors and generators (SIC 3621)	Industrial controls (SIC 3622)	Welding apparatus, electric (SIC 3623)	Carbon and graphite products (SIC 3624)	Electrical industrial apparatus, n.e.c. (SIC 3629)
Companies ¹	244	512	348	853	164	71	309
All establishments ²	293	646	471	914	182	91	323
With 1 to 19 employees	131	312	147	506	74	31	203
With 20 to 99 employees	84	179	137	284	75	31	80
With 100 employees or more	78	155	187	124	33	29	40
All employees:							
Average for year	39.0	66.0	84.1	64.1	15.0	12.1	16.3
Annual payroll ³	732.1	1 256.7	1 545.7	1 282.1	340.8	260.7	280.4
Production workers:							
Average for year	28.5	44.5	61.0	34.4	10.0	8.5	11.3
March	30.6	47.8	66.6	37.1	10.9	9.6	11.9
May	29.5	45.3	63.6	36.0	10.4	9.2	11.3
August	27.5	43.0	59.1	31.9	9.8	7.9	11.2
November	26.3	41.9	54.7	32.7	8.9	7.2	10.8
Hours	51.3	83.4	114.3	65.4	17.8	16.8	21.5
January to March	13.8	22.4	31.7	17.5	5.1	4.8	5.6
April to June	13.4	21.5	30.7	16.9	4.8	4.5	5.5
July to September	12.0	19.5	26.1	15.7	4.1	3.9	5.2
October to December	12.1	19.8	25.8	15.2	3.8	3.5	5.2
Wages	461.0	716.3	983.7	560.0	204.8	165.9	154.5
Value added by manufacture ⁴	1 439.0	3 133.0	3 434.3	2 605.2	684.2	554.9	644.7
Cost of materials, etc. ⁵	1 421.8	1 947.2	2 525.9	1 666.2	643.8	467.4	456.3
Materials, parts, containers, etc., consumed	1 330.8	1 653.3	2 322.6	1 467.8	576.1	314.4	403.2
Resales	31.7	206.5	74.0	125.1	24.7	(D)	27.5
Fuels consumed ⁶	18.3	16.0	35.6	12.4	7.5	34.3	5.2
Purchased electric energy ⁷	34.1	40.2	66.4	32.7	14.7	52.2	11.7
Contract work	6.9	31.2	27.2	28.3	20.8	(D)	8.6
Value of shipments, including resales	2 916.0	5 172.8	6 058.1	4 331.1	1 353.2	980.4	1 111.3
Value of resales	41.5	272.8	96.4	164.7	25.5	(D)	33.2

See footnotes at end of table.

Table 3a. Summary Statistics for the Industry: 1982—Con.

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Transformers (SIC 3612)	Switchgear and switchboard apparatus (SIC 3613)	Motors and generators (SIC 3621)	Industrial controls (SIC 3622)	Welding apparatus, electric (SIC 3623)	Carbon and graphite products (SIC 3624)	Electrical industrial apparatus, n.e.c. (SIC 3629)
Manufacturers' inventories (see tables 3b and 3c)							
Capital expenditures for plant and equipment ^a mil. dol....	79.6	153.7	308.4	190.1	54.8	158.9	31.5
New capital expenditures do.....	76.5	142.6	275.4	178.9	44.4	151.9	29.3
New buildings and other structures do.....	11.3	16.2	27.0	43.6	13.3	40.0	3.9
New machinery and equipment ^b do.....	65.2	126.5	248.3	135.3	31.1	111.8	25.4
Used capital expenditures do.....	3.2	11.1	33.1	11.3	10.5	7.1	2.2
Primary product specialization ratio ^c percent....	94	91	94	93	89	94	87
Coverage ratio ^d do.....	96	93	81	87	94	93	92

¹For the census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.

²Includes establishments with payroll at any time during year.

³Data on supplemental labor costs are not included in annual payroll, but are shown in table 3d.

⁴Value added by manufacture is computed using inventory data reported on a cost or market basis prior to any adjustment to LIFO cost. See table 3b, footnote 1 for further explanation.

⁵Data on purchased services for the repair of buildings and machinery and for communication services are not included in cost of materials, etc., but are shown in table 3d.

⁶Data on purchased fuels by type were not collected for 1982. See MC82-S-4, Fuels and Electric Energy Consumed, for 1981 data on purchased fuels by type.

⁷Data on quantity of electric energy used for heat and power are included in table 3d.

⁸Data on capital expenditures for new machinery and equipment by type, depreciable assets, retirements, rental payments, and depreciation are included in table 3d.

⁹Represents ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for establishments classified in industry.

¹⁰Represents ratio of primary products shipped by establishments classified in industry to total shipments of such products by all manufacturing establishments, wherever classified.

Table 3b. Value of Inventories for the Industry: End of 1981 and 1982

[Million dollars. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Transformers (SIC 3612)		Switchgear and switchboard apparatus (SIC 3613)		Motors and generators (SIC 3621)		Industrial controls (SIC 3622)	
	End of 1981	End of 1982	End of 1981	End of 1982	End of 1981	End of 1982	End of 1981	End of 1982
Total Inventories¹	630.6	536.6	1 154.3	1 049.2	1 263.5	1 087.6	1 137.8	1 052.8
Detail by method of valuation:								
Subject to LIFO costing ²	416.6	335.2	518.0	465.3	631.1	530.4	333.5	297.4
LIFO reserve	179.4	146.5	237.6	215.0	266.4	222.5	93.7	88.4
LIFO value	237.2	188.7	280.4	250.3	364.7	307.9	239.8	209.0
Not subject to LIFO costing	149.0	145.6	526.7	477.8	513.2	448.1	600.7	592.0
Valuation method not reported ³	64.5	55.3	99.2	95.8	115.0	105.4	182.9	149.5
Amount subject to LIFO reported without associated reserve and value ⁴ .....	.5	.5	10.3	10.3	4.2	3.7	20.7	13.8
Detail by stage of fabrication:								
Finished goods	157.0	152.2	344.6	324.7	330.0	304.5	188.1	200.2
Work in process	268.8	218.3	473.3	400.6	484.2	411.8	467.6	395.8
Materials and supplies	204.9	166.1	336.3	323.9	449.3	371.4	482.1	456.8

Item	Welding apparatus, electric (SIC 3623)		Carbon and graphite products (SIC 3624)		Electrical industrial apparatus, n.e.c. (SIC 3629)	
	End of 1981	End of 1982	End of 1981	End of 1982	End of 1981	End of 1982
Total Inventories¹	416.9	372.7	582.0	601.9	251.4	230.9
Detail by method of valuation:						
Subject to LIFO costing ²	240.9	213.4	222.4	226.5	114.8	97.1
LIFO reserve	110.7	94.6	112.0	112.6	36.1	34.7
LIFO value	130.2	118.9	110.4	113.9	78.8	62.4
Not subject to LIFO costing	134.0	118.8	345.8	360.6	93.9	93.3
Valuation method not reported ³	42.0	40.5	13.7	14.6	41.1	39.0
Amount subject to LIFO reported without associated reserve and value ⁴	-	-	.2	.1	1.6	1.6
Detail by stage of fabrication:						
Finished goods	151.0	143.1	102.2	122.7	50.8	47.0
Work in process	114.3	97.0	364.6	386.1	84.8	78.3
Materials and supplies	151.6	132.5	115.2	93.1	115.8	105.7

¹Effective with the 1982 Economic Censuses, uniform instructions for reporting inventories were introduced for all sector reports. Prior to 1982, respondents were permitted to value inventories using any generally accepted accounting method (LIFO, FIFO, market, to name a few). In 1982, all respondents were requested to report inventories at cost or market. LIFO users were asked to first report inventory values prior to the LIFO adjustment and then to report the LIFO reserve and the LIFO value after adjustment for the reserve. For further explanation, see inventories in appendixes.

²Only includes data reported by respondents who (a) indicated amount of inventories subject to LIFO cost, and (b) provided sufficient information to determine associated LIFO reserve and value figures.

³Includes data estimated for nonresponse and nonmail administrative records and data reported by respondents who provided total inventory figures without other information.

⁴Includes data reported by respondents who indicated their inventories were subject to LIFO cost, but did not provide associated LIFO reserve and value figures.

Table 3c. Inventories by Specific Method of Valuation for the Industry: End of 1982

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Transformers (SIC 3612)		Switchgear and switchboard apparatus (SIC 3613)		Motors and generators (SIC 3621)		Industrial controls (SIC 3622)	
	Percent of total	Absolute standard error (percent)	Percent of total	Absolute standard error (percent)	Percent of total	Absolute standard error (percent)	Percent of total	Absolute standard error (percent)
Total Inventories	100.0	(X)	100.0	(X)	100.0	(X)	100.0	(X)
Last-In, First-Out (LIFO) methods	62.5	(X)	44.3	(X)	48.8	(X)	28.2	(X)
Non-LIFO methods	27.1	(X)	45.5	(X)	41.2	(X)	56.2	(X)
Cost basis:								
First-In, First-Out (FIFO)	12.1	.6	15.9	.9	12.6	1.0	14.0	1.2
Average cost	(Z)	(Z)	3.7	.9	4.4	.3	3.6	.9
Specific or actual cost	1.4	.5	1.1	.1	2.7	1.0	5.7	2.0
Standard cost	12.6	.6	23.4	1.0	20.2	1.2	31.8	1.9
Other .....	.4	(Z)	(S)	(S)	1.2	.1	.3	.1
Market basis:								
Market lower than cost	(Z)	(Z)	.2	(Z)	.1	(Z)	(Z)	(Z)
Market always used	(S)	(S)	(S)	(S)	(Z)	(Z)	(S)	(S)
Valuation method not reported	10.3	(X)	9.1	(X)	9.7	(X)	14.2	(X)
Amount subject to LIFO reported without associated reserve and value .....	.1	(X)	1.0	(X)	.3	(X)	1.3	(X)

Item	Welding apparatus, electric (SIC 3623)		Carbon and graphite products (SIC 3624)		Electrical industrial apparatus, n.e.c. (SIC 3629)	
	Percent of total	Absolute standard error (percent)	Percent of total	Absolute standard error (percent)	Percent of total	Absolute standard error (percent)
Total Inventories	100.0	(X)	100.0	(X)	100.0	(X)
Last-In, First-Out (LIFO) methods	57.3	(X)	37.6	(X)	42.0	(X)
Non-LIFO methods	31.9	(X)	59.9	(X)	40.4	(X)
Cost basis:						
First-In, First-Out (FIFO)	11.5	3.0	3.2	1.2	16.7	3.1
Average cost	2.7	.8	2.3	(Z)	11.2	1.7
Specific or actual cost	3.4	.9	.8	.1	.9	.2
Standard cost	11.9	2.2	48.6	1.1	11.5	1.5
Other	2.4	.5	4.9	.1	(Z)	(Z)
Market basis:						
Market lower than cost .....	.1	(Z)	(S)	(S)	(Z)	(Z)
Market always used	(Z)	(Z)	(Z)	(Z)	(Z)	(Z)
Valuation method not reported	10.9	(X)	2.4	(X)	16.9	(X)
Amount subject to LIFO reported without associated reserve and value	(Z)	(X)	(Z)	(X)	.7	(X)

Note: The percentages shown for the LIFO and non-LIFO totals and the categories "valuation method not reported" and "amount subject to LIFO reported..." are based on the census universe estimates included in table 3b. The percentages shown for the specific non-LIFO methods of valuation (e.g., FIFO, etc.) are based on a representative sample of establishments included in the annual survey of manufactures (ASM) panel for 1982 (see appendixes for description of ASM). The absolute standard error of each of the ASM estimates is shown above.

Table 3d. Supplemental Industry Statistics Based on Sample Estimates: 1982

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Transformers (SIC 3612)		Switchgear and switchboard apparatus (SIC 3613)		Motors and generators (SIC 3621)		Industrial controls (SIC 3622)	
	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)
Supplemental labor costs:								
Total	185.7	1	289.5	2	397.1	1	272.8	2
Legal costs	63.8	1	108.6	2	141.6	1	97.7	2
Voluntary costs	121.9	1	180.8	2	255.5	2	175.0	2
Purchased services:								
Cost of purchased services for the repair of—								
Buildings and other structures	5.9	2	37.6	1	7.8	3	40.2	78
Response coverage ratio (percent) ²	87.7	(X)	80.1	(X)	84.6	(X)	75.4	(X)
Machinery	18.1	2	23.7	3	40.3	3	13.1	7
Response coverage ratio (percent) ²	87.4	(X)	81.1	(X)	87.6	(X)	78.7	(X)
Cost of purchased communication services	10.0	3	15.4	4	19.8	4	227.1	81
Response coverage ratio (percent) ²	86.0	(X)	82.8	(X)	89.2	(X)	78.5	(X)
Electric energy used for heat and power:								
Purchased:								
Quantity (million kWh)	745.6	1	1 163.4	1	1 330.4	1	660.7	1
Cost	34.1	(X)	40.2	(X)	66.4	(X)	32.7	(X)
Generated less sold (million kWh)	—	1	.9	1	(S)	(S)	—	1
Gross book value of depreciable assets:								
Total:								
Beginning of year	979.2	2	1 250.0	2	2 136.2	2	1 021.0	3
New capital expenditures	69.8	3	128.4	3	255.2	2	133.0	3
Used capital expenditures	3.2	6	11.2	12	33.9	6	12.9	39
Retirements	27.6	11	84.4	3	86.3	3	34.1	10
End of year	1 024.8	2	1 305.3	2	2 339.0	2	1 132.8	2

See footnotes at end of table.

Table 3d. Supplemental Industry Statistics Based on Sample Estimates: 1982—Con.

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Transformers (SIC 3612)		Switchgear and switchboard apparatus (SIC 3813)		Motors and generators (SIC 3621)		Industrial controls (SIC 3622)	
	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)
Gross book value of depreciable assets—Con.								
Buildings and other structures:								
Beginning of year	304.9	2	399.2	2	500.5	3	362.0	3
New capital expenditures	7.9	11	13.5	7	23.7	2	33.6	2
Used capital expenditures	.6	20	2.6	52	7.4	1	4.2	8
Retirements	2.9	4	31.3	1	10.8	6	5.9	6
End of year	310.4	2	384.0	3	520.8	3	393.9	3
Machinery and equipment:								
Beginning of year	674.3	2	850.8	2	1 635.7	2	659.0	3
New capital expenditures	61.9	3	114.9	2	231.5	2	99.4	4
Automobiles, trucks, etc., for highway use	.7	22	2.2	16	2.6	7	1.9	25
Computers and peripheral data processing equipment	3.3	5	9.2	5	7.9	7	16.9	11
All other	49.2	3	94.2	2	173.3	1	72.7	3
New machinery and equipment, n.s.k. ³	8.8	(S)	9.4	(S)	47.7	(S)	7.9	(S)
Used capital expenditures	2.6	5	8.7	2	26.6	7	8.7	57
Retirements	24.6	12	53.1	5	75.6	3	28.2	11
End of year	714.2	2	921.4	2	1 818.2	2	738.9	2
Rental payments:								
Total	13.7	2	30.9	7	34.2	6	38.3	6
Buildings and other structures	3.1	2	14.9	14	10.8	18	15.4	10
Machinery and equipment	10.6	2	16.0	5	23.5	3	22.8	8
Depreciation charges during 1982:								
Total	58.2	2	94.1	4	188.4	2	86.3	4
Buildings and other structures	12.1	2	19.1	11	32.2	9	22.4	9
Machinery and equipment	46.1	2	75.0	3	156.2	1	63.9	3
Item	Welding apparatus, electric (SIC 3623)		Carbon and graphite products (SIC 3624)		Electrical industrial apparatus, n.e.c. (SIC 3629)			
	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)		
Supplemental labor costs:								
Total	74.6	3	71.9	5	65.7	3		
Legal costs	31.0	2	27.2	6	25.8	3		
Voluntary costs	43.6	5	44.7	6	39.8	5		
Purchased services:								
Cost of purchased services for the repair of—								
Buildings and other structures	1.7	15	1.4	6	5.6	5		
Response coverage ratio (percent) ²	70.4	(X)	66.7	(X)	82.4	(X)		
Machinery	5.6	19	10.1	5	8.9	8		
Response coverage ratio (percent) ²	74.0	(X)	72.0	(X)	82.4	(X)		
Cost of purchased communication services	4.0	17	2.6	8	8.8	4		
Response coverage ratio (percent) ²	68.6	(X)	86.7	(X)	79.3	(X)		
Electric energy used for heat and power:								
Purchased:								
Quantity (million kWh)	248.0	2	1 486.8	1	203.5	2		
Cost	14.7	(X)	52.2	(X)	11.7	(X)		
Generated less sold (million kWh)	.1	1	(S)	(S)	(S)	(S)		
Gross book value of depreciable assets:								
Total:								
Beginning of year	410.2	7	1 012.4	1	288.5	5		
New capital expenditures	35.6	23	125.2	3	27.3	13		
Used capital expenditures	6.2	24	7.9	17	2.0	15		
Retirements	11.1	31	16.4	1	4.7	9		
End of year	441.0	7	1 129.2	1	313.1	4		
Buildings and other structures:								
Beginning of year	128.8	6	263.4	2	67.1	6		
New capital expenditures	4.4	10	38.2	2	3.8	25		
Used capital expenditures	.1	30	1.6	1	1.2	1		
Retirements	1.3	24	3.6	1	.6	20		
End of year	132.0	6	299.6	2	71.5	5		
Machinery and equipment:								
Beginning of year	281.4	10	749.0	1	221.4	5		
New capital expenditures	31.2	26	87.0	3	23.5	12		
Automobiles, trucks, etc., for highway use	1.4	34	.7	2	.5	15		
Computers and peripheral data processing equipment	1.1	45	2.6	2	.9	17		
All other	26.3	29	47.3	4	15.8	4		
New machinery and equipment, n.s.k. ³	2.4	(S)	36.3	(S)	6.3	(S)		
Used capital expenditures	6.1	25	6.3	22	.8	37		
Retirements	9.8	34	12.8	1	4.1	8		
End of year	308.9	10	829.5	1	241.6	4		
Rental payments:								
Total	9.1	15	2.9	26	5.8	5		
Buildings and other structures	4.4	21	1.3	63	3.0	11		
Machinery and equipment	4.7	11	1.6	4	2.8	7		
Depreciation charges during 1982:								
Total	31.9	12	41.2	2	24.3	4		
Buildings and other structures	6.0	7	8.2	2	4.9	4		
Machinery and equipment	25.9	14	33.1	2	19.3	4		

See footnotes at end of table.

Table 3d. Supplemental Industry Statistics Based on Sample Estimates: 1982—Con.

Note: Data for total new capital expenditures, new building expenditures, new machinery expenditures, and total used expenditures are also shown in table 3a. Data in table 3a are census universe totals and may differ from annual survey of manufactures (ASM) sample estimates shown in this table. Data in this table represent best estimates of year-to-year change as measured by the continuing ASM sample. However, they are subject to sampling error and, hence, as estimates of level, are not as reliable as universe figures shown in table 3a.

¹For description of relative standard error of estimate, see Qualifications of the Data in appendixes.

²Measure of extent to which respondents reported each item. Derived for each item by calculating the ratio of weighted employment for those sample establishments that reported the specific inquiry to weighted total employment for all sample establishments classified in industry. (See appendixes for explanation of sample weight.)

³Represents total machinery and equipment expenditures for establishments that did not break down their expenditures by specific type.

Table 4. Industry Statistics by Employment Size of Establishment: 1982

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and employment size class	E ¹	All establishments (no.)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)					
INDUSTRY 3612, TRANSFORMERS												
Total.....	-	293	39.0	732.1	28.5	51.3	461.0	1 439.0	1 421.8	2 918.0	78.5	536.8
Establishments with an average of—												
1 to 4 employees.....	E9	51	.1	1.3	.1	.1	1.0	3.0	3.2	6.3	.2	1.1
5 to 9 employees.....	E7	33	.2	2.8	.2	.3	1.8	5.9	5.9	11.7	.4	1.9
10 to 19 employees.....	E5	47	.7	9.6	.5	.9	6.4	16.2	24.8	40.8	1.4	8.4
20 to 49 employees.....	E2	50	1.6	22.8	1.2	2.2	13.7	46.8	42.7	92.9	2.6	13.8
50 to 99 employees.....	E1	34	2.6	38.9	2.0	3.7	26.1	71.5	95.9	173.3	3.9	30.4
100 to 249 employees.....	-	37	6.0	90.9	4.7	8.6	63.2	205.6	252.3	461.6	10.8	77.1
250 to 499 employees.....	-	18	5.7	102.1	4.0	7.2	59.4	260.8	214.2	477.7	10.9	86.5
500 to 999 employees.....	-	17	11.8	227.7	8.4	13.9	135.7	405.2	479.9	901.7	27.2	172.7
1,000 to 2,499 employees.....	-	5	10.3	236.3	7.5	14.3	153.8	423.9	303.1	749.9	19.4	144.8
2,500 employees or more.....	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records ²	E9	87	.7	8.0	.5	1.0	5.3	15.9	16.7	32.8	.8	5.6
INDUSTRY 3613, SWITCHGEAR AND SWITCHBOARD APPARATUS												
Total.....	-	646	66.0	1 256.7	44.5	83.4	718.3	3 133.0	1 947.2	5 172.8	142.8	1 049.2
Establishments with an average of—												
1 to 4 employees.....	E7	133	.3	4.2	.2	.3	2.9	10.7	8.6	19.4	.4	5.1
5 to 9 employees.....	E6	103	.7	12.9	.5	1.0	7.6	30.5	24.6	57.8	1.9	10.6
10 to 19 employees.....	E5	76	1.1	19.6	.7	1.4	11.2	41.7	33.9	78.9	1.7	11.8
20 to 49 employees.....	E2	111	3.5	69.4	2.4	4.5	37.5	157.3	145.1	302.7	5.1	50.6
50 to 99 employees.....	E2	68	4.9	87.5	3.5	6.6	51.3	182.3	178.6	362.7	11.2	68.2
100 to 249 employees.....	-	82	12.9	221.3	9.0	16.8	130.9	563.1	446.7	1 019.8	26.4	186.5
250 to 499 employees.....	-	46	18.5	292.6	11.4	20.6	175.9	756.1	532.3	1 309.3	35.7	254.1
500 to 999 employees.....	-	18	11.9	216.2	8.0	15.1	123.0	608.1	276.8	900.0	31.8	187.2
1,000 to 2,499 employees.....	-	9	14.3	333.0	8.8	17.0	176.1	783.1	300.6	1 124.2	28.5	275.0
Covered by administrative records ²	E9	152	.9	13.5	.6	1.3	8.0	34.0	21.1	55.6	1.4	11.1
INDUSTRY 3621, MOTORS AND GENERATORS												
Total.....	-	471	84.1	1 545.7	81.0	114.3	983.7	3 434.3	2 525.9	8 058.1	275.4	1 087.8
Establishments with an average of—												
1 to 4 employees.....	E9	50	.1	1.4	.1	.1	1.1	3.2	2.7	6.0	.2	1.1
5 to 9 employees.....	E6	51	.4	6.3	.3	.5	4.4	16.1	16.1	32.5	1.3	5.1
10 to 19 employees.....	E5	46	.6	10.2	.4	.8	6.6	16.0	21.6	38.1	1.3	6.9
20 to 49 employees.....	E2	88	2.8	49.5	2.0	3.8	30.6	111.5	97.4	210.2	34.3	48.4
50 to 99 employees.....	E1	51	3.8	60.5	2.7	5.2	36.3	121.8	125.3	253.3	6.5	46.7
100 to 249 employees.....	-	71	11.5	186.4	8.4	15.9	114.1	409.5	315.0	741.1	26.9	170.0
250 to 499 employees.....	-	69	24.9	423.5	18.6	33.8	278.7	964.8	774.9	1 775.5	70.8	314.2
500 to 999 employees.....	-	38	25.1	475.7	18.0	34.7	303.0	969.3	661.6	1 659.1	74.2	292.5
1,000 to 2,499 employees.....	-	8	14.9	332.2	10.5	19.4	208.9	822.1	511.2	1 342.3	59.9	202.7
2,500 employees or more.....	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records ²	E9	95	.8	10.0	.6	1.1	7.1	20.2	16.8	37.2	1.5	6.3
INDUSTRY 3622, INDUSTRIAL CONTROLS												
Total.....	E1	914	64.1	1 282.1	34.4	85.4	560.0	2 605.2	1 666.2	4 331.1	178.9	1 052.8
Establishments with an average of—												
1 to 4 employees.....	E8	222	.4	6.8	.3	.5	3.8	16.4	11.2	28.1	1.0	6.0
5 to 9 employees.....	E7	139	.9	15.9	.6	1.1	7.8	36.5	25.5	62.6	2.1	12.9
10 to 19 employees.....	E5	145	2.0	35.4	1.2	2.5	16.5	67.9	50.0	119.1	10.6	23.3
20 to 49 employees.....	E2	203	6.4	119.9	3.6	6.9	53.8	241.5	175.8	421.9	12.5	85.8
50 to 99 employees.....	E1	81	5.6	107.6	3.1	5.8	45.5	203.8	152.6	358.4	10.6	87.7
100 to 249 employees.....	E1	71	11.2	207.2	6.2	11.8	87.7	417.0	298.7	728.1	29.2	184.8
250 to 499 employees.....	-	29	9.9	202.1	5.2	9.9	84.1	415.6	298.2	730.6	18.2	172.8
500 to 999 employees.....	-	17	12.7	225.0	7.1	14.2	110.6	501.8	286.7	790.9	31.3	193.0
1,000 to 2,499 employees.....	-	5	14.9	362.2	7.2	12.6	150.1	704.7	367.5	1 091.4	63.3	286.5
2,500 employees or more.....	-	2	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records ²	E9	330	2.0	29.0	1.2	2.3	14.2	66.5	41.3	108.8	4.3	24.8
INDUSTRY 3623, WELDING APPARATUS, ELECTRIC												
Total.....	-	182	15.0	340.8	10.0	17.8	204.8	684.2	643.8	1 353.2	44.4	372.7
Establishments with an average of—												
1 to 4 employees.....	E7	33	.1	.9	(Z)	.1	.6	1.7	1.8	3.5	.1	.7
5 to 9 employees.....	E6	22	.2	2.5	.1	.2	1.5	5.4	6.3	11.7	.5	2.5
10 to 19 employees.....	E6	19	.2	4.8	.2	.3	2.7	8.6	9.2	17.8	.5	4.1
20 to 49 employees.....	E2	47	1.4	27.9	.9	1.9	16.5	45.9	57.3	105.9	5.5	27.3
50 to 99 employees.....	E1	28	2.0	43.0	1.2	2.2	19.7	91.2	100.9	193.0	15.9	56.7
100 to 249 employees.....	-	20	2.9	71.9	1.9	3.6	41.9	127.3	126.5	258.5	9.4	74.4
250 to 499 employees.....	-	9	3.2	64.3	2.0	3.6	37.5	117.7	108.3	229.0	5.6	58.1
500 to 999 employees.....	-	2	4.9	125.6	3.7	5.8	84.3	286.5	233.6	533.7	6.9	148.9
1,000 to 2,499 employees.....	-	2	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records ²	E9	43	.3	4.3	.2	.4	2.6	8.2	10.7	19.0	.8	3.8

See footnotes at and of table.

Table 4. Industry Statistics by Employment Size of Establishment: 1982—Con.

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and employment size class	E ¹	All establishments (no.)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)					
INDUSTRY 3624, CARBON AND GRAPHITE PRODUCTS												
Total.....	-	91	12.1	260.7	8.5	18.8	185.9	554.9	467.4	980.4	151.9	601.9
Establishments with an average of—												
1 to 4 employees.....	E4	8	(Z)	.2	(Z)	(Z)	.1	.4	.5	1.0	92.8	.3
5 to 9 employees.....	E6	9	.1	1.1	(Z)	.1	.7	2.6	2.5	5.1	(D)	1.4
10 to 19 employees.....	E3	14	.2	3.9	.2	.3	2.5	8.6	5.7	13.6	(D)	3.7
20 to 49 employees.....	E3	18	.5	10.5	.4	.7	6.0	23.9	14.4	39.7	(D)	10.7
50 to 99 employees.....	E1	13	1.0	18.4	.7	1.4	11.6	37.8	19.3	57.4	(D)	11.7
100 to 249 employees.....	-	16	2.7	58.9	1.8	3.5	34.3	167.4	101.0	242.8	(D)	139.4
250 to 499 employees.....	-	5	1.8	36.3	1.3	2.5	22.4	45.2	35.4	85.6	3.5	34.9
500 to 999 employees.....	-	7	5.8	131.5	4.1	8.2	88.4	268.9	288.7	535.2	55.6	399.8
1,000 to 2,499 employees.....	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records ²	E9	11	.1	2.1	.1	.2	1.4	4.3	5.1	9.6	.4	3.5
INDUSTRY 3629, ELECTRICAL INDUSTRIAL APPARATUS, N.E.C.												
Total.....	E1	323	18.3	280.4	11.3	21.5	154.5	644.7	456.3	1 111.3	29.3	230.9
Establishments with an average of—												
1 to 4 employees.....	E9	104	.2	2.9	.1	.3	1.8	7.3	6.5	13.9	.4	2.9
5 to 9 employees.....	E8	50	.3	4.8	.2	.5	2.7	11.3	8.3	19.6	.4	4.2
10 to 19 employees.....	E3	49	.6	9.5	.4	.9	5.5	28.6	19.8	48.2	.8	9.9
20 to 49 employees.....	E3	57	1.8	28.5	1.3	2.5	16.3	71.1	49.7	120.4	2.7	22.5
50 to 99 employees.....	E1	23	1.6	23.0	1.1	2.0	12.7	49.5	41.8	91.6	3.2	20.1
100 to 249 employees.....	-	26	4.3	71.2	2.9	5.3	34.3	154.5	113.9	267.0	6.4	54.0
250 to 499 employees.....	E3	8	2.7	47.0	1.8	4.0	23.6	135.3	88.5	227.2	4.2	60.7
500 to 999 employees.....	-	5	4.7	93.5	3.5	6.1	57.5	187.1	127.8	323.4	11.2	56.6
1,000 to 2,499 employees.....	-	1	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records ²	E9	155	.7	10.1	.5	1.1	5.8	22.2	19.1	41.5	.9	8.7

Note: For qualifications of data, see footnotes on table 1a. Data shown as a (D) are included in underscored figures above.

¹Payroll and sales data for some small single-unit companies with up to 20 employees (cutoff varied by industry) were obtained from administrative records of other government agencies rather than from census report forms. These data were then used in conjunction with industry averages to estimate the items shown for these small establishments. This technique was also used for a small number of other establishments whose reports were not received at time data were tabulated. The following symbols are shown for those States where estimated data based on administrative records data account for 10 percent or more of figures shown: E1—10 to 19 percent; E2—20 to 29 percent; E3—30 to 39 percent; E4—40 to 49 percent; E5—50 to 59 percent; E6—60 to 69 percent; E7—70 to 79 percent; E8—80 to 89 percent; E9—90 percent or more.

²Report forms were not mailed to small single-unit companies with up to 20 employees (cutoff varied by industry). Payroll and sales data for 1982 were obtained from administrative records supplied by other agencies of the Federal Government. Those data were then used in conjunction with industry averages to estimate the items shown. Data are also included in respective size classes shown.

Table 5a. Industry Statistics by Industry and Primary Product Class Specialization: 1982

[Table presents selected statistics for establishments according to their degree of specialization in products primary to their industry. Measures of plant specialization shown are (1) industry specialization: ratio of primary product shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment; and (2) product class specialization: ratio of largest primary product class shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment. See appendix for method of computing ratios. Statistics for establishments with specialization ratios of less than 75 percent are included in total lines but are not shown as a separate class. In addition, data may not be shown for various reasons; e.g., to avoid disclosing data for individual companies. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes.]

Industry or product class code	Industry or product class by percent of specialization	All establishments (number)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)				
3612	Transformers:										
	Entire industry.....	293	39.0	732.1	28.5	51.3	461.0	1 439.0	1 421.8	2 916.0	76.5
	Establishments with 75 percent specialization or more ..	274	33.7	619.3	24.7	44.0	397.0	1 230.1	1 286.6	2 562.0	70.1
36122	Power and distribution transformers:										
	Establishments with this product class primary ..	63	20.2	454.6	13.7	25.7	274.6	899.8	841.9	1 787.4	45.7
	Establishments with 75 percent specialization or more in class ..	54	15.0	322.9	10.1	18.6	196.5	672.4	706.1	1 401.9	36.0
36124	Fluorescent lamp ballasts:										
	Establishments with this product class primary ..	17	6.0	84.0	5.3	8.1	63.0	111.7	219.2	332.3	10.1
	Establishments with 75 percent specialization or more in class ..	16	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
36125	Specialty transformers:										
	Establishments with this product class primary ..	56	7.9	123.8	6.1	10.9	82.2	283.6	251.3	538.5	14.9
	Establishments with 75 percent specialization or more in class ..	43	4.5	63.1	3.7	6.4	45.8	127.8	146.3	276.9	9.1
36127	Other transformers, including parts for all transformers:										
	Establishments with this product class primary ..	18	2.2	35.7	1.3	2.8	19.2	75.7	48.9	126.6	2.1
	Establishments with 75 percent specialization or more in class ..	15	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3613	Switchgear and switchboard apparatus:										
	Entire industry.....	646	66.0	1 256.7	44.5	83.4	716.3	3 133.0	1 947.2	5 172.8	142.6
	Establishments with 75 percent specialization or more ..	571	54.7	1 045.6	37.2	70.2	605.0	2 645.3	1 655.8	4 358.6	123.7
36132	Power circuit breakers, all voltages:										
	Establishments with this product class primary ..	26	5.4	124.6	3.2	6.3	69.1	264.0	155.4	420.5	13.7
	Establishments with 75 percent specialization or more in class ..	19	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
36133	Low voltage panelboards and distribution boards:										
	Establishments with this product class primary ..	159	17.3	336.8	11.8	21.9	197.6	810.5	675.9	1 520.6	44.2
	Establishments with 75 percent specialization or more in class ..	99	7.5	143.4	5.3	9.8	87.3	412.6	316.8	732.6	23.3

See footnotes at end of table.

Table 5a. Industry Statistics by Industry and Primary Product Class Specialization: 1982—
Con.

[Table presents selected statistics for establishments according to their degree of specialization in products primary to their industry. Measures of plant specialization shown are (1) industry specialization: ratio of primary product shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment; and (2) product class specialization: ratio of largest primary product class shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment. See appendix for method of computing ratios. Statistics for establishments with specialization ratios of less than 75 percent are included in total lines but are not shown as a separate class. In addition, data may not be shown for various reasons; e.g., to avoid disclosing data for individual companies. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes.]

Industry or product class code	Industry or product class by percent of specialization	All establishments (number)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)				
36134	Fuses and fuse equipment, less than 2300 volts: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	16 15	5.3 (D)	83.4 (D)	3.6 (D)	6.2 (D)	42.6 (D)	187.3 (D)	59.4 (D)	254.3 (D)	9.6 (D)
36135	Molded case circuit breakers, 750 volts or less: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	15 11	8.9 5.4	162.4 89.4	6.4 3.9	12.1 7.1	103.4 55.8	544.2 317.9	161.2 87.6	711.3 406.9	23.0 11.9
36136	Duct, including plug-in units, 750 volts or less: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	11 5	1.9 (D)	33.4 (D)	1.4 (D)	2.4 (D)	22.0 (D)	95.6 (D)	64.3 (D)	163.6 (D)	3.6 (D)
36138	Relays, switchgear: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	38 27	8.9 5.5	141.6 89.1	6.0 3.8	11.3 7.1	79.3 52.2	305.7 188.3	147.3 88.2	475.7 282.6	16.2 12.4
38139	Switchgear, except ducts and relays: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	115 72	15.4 10.9	325.0 230.4	9.9 7.0	18.9 13.5	173.0 123.5	808.0 582.2	609.2 429.4	1 433.7 1 028.5	25.2 17.1
3621	Motors and generators: Entire industry ----- Establishments with 75 percent specialization or more ..	471 428	84.1 74.2	1 545.7 1 354.9	61.0 54.6	114.3 102.2	983.7 873.6	3 434.3 3 034.0	2 525.9 2 270.9	6 058.1 5 384.4	275.4 229.0
36211	Fractional horsepower motors: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	136 110	37.8 29.7	648.7 508.5	29.2 23.8	54.7 44.5	446.5 369.1	1 427.0 1 138.1	1 034.5 853.6	2 507.4 2 029.6	112.4 98.4
36212	Integral horsepower motors and generators: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	55 32	22.1 13.5	439.9 277.5	15.1 9.4	29.0 18.3	270.4 172.5	1 029.4 615.6	592.1 347.9	1 644.7 980.4	72.2 50.5
36213	Land transportation motors and generators: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	8 5	2.2 (D)	51.8 (D)	.9 (D)	1.9 (D)	18.1 (D)	83.7 (D)	85.7 (D)	170.4 (D)	7.5 (D)
36214	Prime mover generator sets: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	26 23	5.3 (D)	113.8 (D)	3.2 (D)	5.5 (D)	54.5 (D)	290.9 (D)	326.1 (D)	623.7 (D)	15.2 (D)
36217	Motor generator sets, fractional: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	20 14	4.6 2.7	76.6 45.2	3.6 2.1	6.6 4.0	52.0 30.7	153.4 88.4	140.4 58.3	301.3 146.7	10.6 5.5
36218	Motor generator sets, integral: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	19 14	5.2 (D)	91.9 (D)	3.8 (D)	6.8 (D)	58.4 (D)	231.9 (D)	172.2 (D)	414.3 (D)	13.9 (D)
36219	Parts for motors and generators: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	40 27	4.0 2.0	75.5 33.2	2.9 1.6	5.6 3.1	50.2 24.3	122.4 61.3	97.3 45.8	221.9 107.3	9.2 4.4
3622	Industrial controls: Entire industry ----- Establishments with 75 percent specialization or more ..	914 850	64.1 59.2	1 282.1 1 187.3	34.4 31.7	65.4 60.1	560.0 513.0	2 605.2 2 399.5	1 666.2 1 528.5	4 331.1 3 986.7	178.9 168.9
36221	Specific purpose industrial controls: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	216 163	22.3 13.2	484.9 277.8	10.4 5.8	20.7 11.1	195.9 97.9	970.0 556.1	591.6 349.2	1 563.4 902.0	51.7 33.2
38222	General purpose industrial controls: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	170 132	32.0 19.9	645.1 385.1	18.3 11.7	33.7 22.6	297.8 178.7	1 297.3 821.5	852.9 581.3	2 207.6 1 438.1	94.2 69.5
36223	Parts for industrial controls: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	18 15	1.6 (D)	27.7 (D)	.9 (D)	1.9 (D)	8.4 (D)	78.8 (D)	57.3 (D)	133.2 (D)	(D) (D)
3623	Welding apparatus, electric: Entire industry ----- Establishments with 75 percent specialization or more ..	182 158	15.0 11.8	340.8 274.0	10.0 8.1	17.8 14.3	204.8 167.8	684.2 568.8	643.8 540.6	1 353.2 1 130.4	44.4 29.3
36231	Arc welding machines, components, and accessories: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	47 38	5.5 4.1	109.7 83.4	3.6 2.8	6.5 4.9	59.6 46.8	206.9 156.8	192.7 153.1	418.4 324.9	13.8 12.3
36232	Arc welding electrodes, metal: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	26 22	5.6 (D)	138.9 (D)	3.8 (D)	6.0 (D)	89.8 (D)	321.3 (D)	322.8 (D)	650.5 (D)	20.6 (D)
36233	Resistance welders, components, accessories: Establishments with this product class primary ----- Establishments with 75 percent specialization or more in class -----	39 26	3.1 (D)	78.4 (D)	2.1 (D)	4.3 (D)	47.7 (D)	134.5 (D)	96.9 (D)	230.3 (D)	5.1 (D)

See footnotes at end of table.

Table 5a. Industry Statistics by Industry and Primary Product Class Specialization: 1982—
Con.

[Table presents selected statistics for establishments according to their degree of specialization in products primary to their industry. Measures of plant specialization shown are (1) industry specialization: ratio of primary product shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment; and (2) product class specialization: ratio of largest primary product class shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment. See appendix for method of computing ratios. Statistics for establishments with specialization ratios of less than 75 percent are included in total lines but are not shown as a separate class. In addition, data may not be shown for various reasons; e.g., to avoid disclosing data for individual companies. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes.]

Industry or product class by percent of specialization	All establishments (number)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)
		Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)				
3624 Carbon and graphite products:										
Entire industry	91	12.1	260.7	8.5	16.8	165.9	554.9	467.4	980.4	151.9
Establishments with 75 percent specialization or more ..	79	10.9	237.7	7.7	15.3	152.7	508.3	435.1	903.8	102.0
36241 Electrodes:										
Establishments with this product class primary	13	4.8	113.3	3.4	6.9	77.0	314.5	283.5	559.3	63.0
Establishments with 75 percent specialization or more in class	10	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
36249 Carbon and graphite products, n.e.c.:										
Establishments with this product class primary	53	7.0	141.3	4.8	9.3	84.7	226.2	172.9	395.6	41.6
Establishments with 75 percent specialization or more in class	43	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
3629 Electrical industrial apparatus, n.e.c.:										
Entire industry	323	16.3	280.4	11.3	21.5	154.5	644.7	456.3	1 111.3	29.3
Establishments with 75 percent specialization or more ..	301	12.8	209.3	8.9	17.1	112.3	504.3	344.0	851.6	19.9
36291 Capacitors for industrial use:										
Establishments with this product class primary	12	3.8	65.3	3.1	5.8	44.6	134.3	114.5	256.4	11.4
Establishments with 75 percent specialization or more in class	8	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
36292 Rectifying apparatus:										
Establishments with this product class primary	66	8.0	142.7	5.3	9.8	74.8	338.5	235.5	574.7	11.8
Establishments with 75 percent specialization or more in class	53	7.1	124.1	4.8	8.8	65.6	294.3	199.2	493.6	10.3
36293 Electrical equipment for industrial use, n.e.c.:										
Establishments with this product class primary	52	3.1	53.6	1.9	3.8	24.1	131.8	73.9	207.2	4.4
Establishments with 75 percent specialization or more in class	47	2.8	47.0	1.7	3.4	21.9	120.4	67.8	190.4	4.3

Note: For qualifications of data, see footnotes on table 1a.

Table 5b. Industry-Product Analysis—Value of Shipments and Primary Product Shipments, Specialization and Coverage Ratios for the Industry: 1982 and Earlier Census Years

[An establishment is assigned to an industry based on shipment values of products representing largest amount considered primary to an industry. Frequently, establishment shipments comprise mixtures of products assigned to an industry (primary), those considered primary to other industries (secondary), and receipts for activities such as merchandising or contract work. Columns A-D show this product pattern for an industry, and column E shows primary product specialization ratio. The extent to which an industry's primary products are shipped by establishments classified in and out of an industry is shown in columns F-H and coverage ratio is shown in column I. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and product group code	Industry and census year	Value of shipments					Value of primary product shipments			
		Total (million dollars)	Primary products (million dollars)	Secondary products (million dollars)	Miscellaneous receipts (million dollars)	Primary product specialization ratio Col. B ÷ Col. B + C (percent)	Total made in all industries (million dollars)	Made in this industry (million dollars)	Made in other industries (million dollars)	Coverage ratio Col. B ÷ Col. F (percent)
		A	B	C	D	E	F	G	H	I
3612 Transformers.....	1982...	2 916.0	2 669.3	178.5	68.2	94	2 772.6	2 669.3	103.3	96
	1977...	2 201.8	2 051.1	109.5	41.2	95	2 117.8	2 051.1	66.7	97
	1972...	1 461.9	1 387.4	55.4	19.1	96	1 436.1	1 387.4	48.7	97
3613 Switchgear and switchboard apparatus	1982...	5 172.8	4 415.2	444.1	313.5	91	4 760.6	4 415.2	345.4	93
	1977...	3 541.0	2 994.9	279.0	267.1	91	3 298.4	2 994.9	303.5	91
	1972...	2 123.5	1 840.5	191.8	91.2	91	2 058.8	1 840.5	218.3	89
3621 Motors and generators	1982...	6 058.1	5 456.5	336.5	265.2	94	6 724.6	5 456.5	1 268.2	81
	1977...	4 458.7	4 001.6	353.4	103.7	92	4 976.2	4 001.6	974.6	80
	1972...	2 501.7	2 144.8	216.5	140.4	91	2 635.7	2 144.8	490.9	81
3622 Industrial controls.....	1982...	4 331.1	3 816.9	286.5	227.7	93	4 376.1	3 816.9	559.2	87
	1977...	2 514.6	2 084.0	312.2	118.4	87	2 429.1	2 084.0	345.1	86
	1972...	1 424.1	1 044.1	298.1	81.9	79	1 245.6	1 044.1	201.5	84
3623 Welding apparatus, electric	1982...	1 353.2	1 163.3	149.9	39.9	89	1 231.6	1 163.3	68.3	94
	1977...	1 191.2	972.1	154.8	64.3	86	1 035.0	972.1	62.9	94
	1972...	659.6	524.4	98.0	37.2	84	570.0	524.4	45.6	92
3624 Carbon and graphite products	1982...	980.4	840.1	54.4	85.8	94	900.9	840.1	60.8	93
	1977...	735.2	619.3	38.4	77.5	94	663.0	619.3	43.7	93
	1972...	377.4	328.6	17.3	31.5	95	335.9	328.6	7.3	98
3629 Electrical industrial apparatus, n.e.c.	1982...	1 111.3	919.5	142.0	49.7	87	1 003.1	919.5	83.5	92
	1977...	692.4	569.2	82.5	40.7	87	699.1	569.2	129.9	81
	1972...	449.4	355.2	61.9	32.3	85	442.9	355.2	87.7	80

Table 5c-1. Industry-Product Analysis—Shipments by Product Class and Industry: 1982

[Million dollars. Table shows where products of an industry (referred to as primary and listed in table 6a) are made and what products are made by establishments classified in an industry. Read down an industry column to find what products are produced in an industry. Only those product groups that have at least \$2 million in shipments from establishments classified in one of industries included in this chapter are shown. Read across to determine where products of industries in this chapter are produced. To extent that some of primary products are made in industries not included in this chapter, value of such shipments is shown in "Other industries" column. Specified "Other industries" are listed in table 5c-2 if they account for more than \$5 million of products primary to this chapter. For meaning of abbreviations and symbols, see explanatory text. For explanation of terms, see appendixes]

1982 product code	Product group, product class, and miscellaneous receipts	All industries	Transformers (SIC 3612)	Switchgear and switchboard apparatus (SIC 3613)	Motors and generators (SIC 3621)	Industrial controls (SIC 3622)	Welding apparatus, electric (SIC 3623)	Carbon and graphite products (SIC 3624)	Electrical industrial apparatus, n.e.c. (SIC 3629)	Other industries
	Total	(X)	2 916.0	5 172.8	8 056.1	4 331.1	1 353.2	980.4	1 111.3	(X)
	Primary products	(X)	2 689.3	4 415.2	5 458.5	3 818.9	1 163.3	840.1	919.5	(X)
	Secondary products	(X)	176.5	444.1	336.5	286.5	149.9	54.4	142.0	(X)
	Miscellaneous receipts	(X)	68.2	313.5	265.2	227.7	39.9	65.6	49.7	(X)
3612-	Transformers	2 772.6	2 689.3	22.7	(D)	(D)	-	-	9.5	(D)
36122	Power and distribution transformers	1 554.0	1 541.8	(D)	(D)	(D)	-	-	(D)	(D)
36124	Fluorescent lamp ballasts	312.1	(D)	-	-	-	-	-	-	(D)
36125	Specialty transformers	545.1	468.5	14.5	(D)	(D)	-	-	(D)	38.3
36127	Other transformers, including parts for all transformers	243.2	232.3	(D)	(D)	-	-	-	(D)	(D)
36120	Transformers, n.s.k.	118.2	(D)	(D)	(D)	-	-	-	-	(D)
3613-	Switchgear and switchboard apparatus	4 780.8	(D)	4 415.2	(D)	126.2	(D)	-	(D)	166.6
36132	Power circuit breakers, all voltages	394.6	(D)	371.5	(D)	(D)	-	-	(D)	(D)
36133	Low voltage panelboards and distribution boards	1 299.5	(D)	1 230.4	(D)	(D)	-	-	(D)	34.4
36134	Fuses and fuse equipment, less than 2300 volts	280.6	(D)	262.4	-	(D)	-	-	(D)	16.3
36135	Molded case circuit breakers, 750 volts or less	711.1	-	(D)	(D)	(D)	-	-	(D)	(D)
36136	Duct, including plug-in units, 750 volts or less	162.5	-	(D)	-	(D)	-	-	(D)	(D)
36138	Relays, switchgear	497.1	-	390.8	-	90.6	-	-	(D)	(D)
36139	Switchgear, except ducts and relays	1 230.5	1.9	1 137.3	(D)	(D)	-	-	(D)	63.8
36130	Switchgear and switchboard apparatus, n.s.k.	184.8	-	174.1	-	.6	(D)	-	-	(D)
3621-	Motors and generators	6 724.6	(D)	(D)	5 456.5	3.3	(D)	-	(D)	1 223.8
36211	Fractional horsepower motors	2 518.7	-	(D)	2 350.1	(D)	-	-	(D)	159.8
36212	Integral horsepower motors and generators	1 454.2	-	-	1 339.8	(D)	(D)	-	-	(D)
36213	Land transportation motors and generators	460.2	-	-	(D)	-	(D)	-	-	(D)
36214	Prime mover generator sets	961.5	-	-	445.5	-	-	-	(D)	(D)
36217	Motor generator sets, fractional	264.5	-	-	246.0	-	-	-	-	18.5
36218	Motor generator sets, integral	379.3	-	(D)	344.2	(D)	-	-	(D)	27.9
36219	Parts for motors and generators	510.6	(D)	-	366.4	-	-	-	(D)	(D)
36210	Motors and generators, n.s.k.	175.6	-	-	(D)	(D)	-	-	-	(D)
3622-	Industrial controls	4 376.1	(D)	176.8	76.1	3 816.9	(D)	-	(D)	304.6
36221	Specific purpose industrial controls	1 406.7	-	19.2	(D)	1 253.8	(D)	-	(D)	(D)
36222	General purpose industrial controls	2 171.8	(D)	138.0	(D)	1 821.2	-	-	(D)	(D)
36223	Parts for industrial controls	344.5	-	14.1	-	320.9	-	-	(D)	(D)
36220	Industrial controls, n.s.k.	453.1	-	5.5	5.4	421.0	-	-	(D)	(D)
3623-	Welding apparatus, electric	1 231.6	(D)	-	(D)	(D)	1 183.3	-	(D)	(D)
36231	Arc welding machines, components, and accessories	511.6	-	-	(D)	(D)	467.6	-	(D)	(D)
36232	Arc welding electrodes, metal	469.6	-	-	-	(D)	(D)	-	(D)	(D)
36233	Resistance welders, components, accessories	187.8	(D)	-	-	-	(D)	-	-	11.7
36230	Welding apparatus, electric, n.s.k.	62.7	-	-	-	-	58.5	-	-	4.2
3624-	Carbon and graphite products	900.9	-	-	-	-	-	840.1	(D)	(D)
36241	Electrodes	440.5	-	-	-	-	-	(D)	-	(D)
36249	Carbon and graphite products, n.e.c.	433.6	-	-	-	-	-	(D)	(D)	(D)
36240	Carbon and graphite products, n.s.k.	26.8	-	-	-	-	-	26.8	-	-
3629-	Electrical industrial apparatus, n.e.c.	1 003.1	(D)	(D)	(D)	(D)	(D)	(D)	919.5	27.6
36291	Capacitors for industrial use	190.0	-	-	(D)	-	-	(D)	(D)	(D)
36292	Rectifying apparatus	524.8	(D)	6.1	(D)	(D)	(D)	-	474.0	10.3
36293	Electrical equipment for industrial use, n.e.c.	213.0	-	(D)	(D)	-	-	(D)	190.2	(D)
36290	Electrical industrial apparatus, n.e.c., n.s.k.	75.3	-	-	-	-	-	-	(D)	(D)
	OTHER SHIPMENTS BY FOUR-DIGIT PRODUCT GROUP									
2819-	Industrial inorganic chemicals, n.e.c.	(X)	-	-	-	-	-	(D)	-	(X)
2899-	Chemical preparations, n.e.c.	(X)	-	-	-	-	(D)	-	-	(X)
3079-	Miscellaneous plastics products	(X)	-	(D)	(D)	(D)	-	-	(D)	(X)
3264-	Porcelain electrical supplies	(X)	(D)	-	-	-	-	(D)	-	(X)
3297-	Nonclay refractories	(X)	-	-	-	-	-	(D)	-	(X)
3299-	Nonmetallic mineral products, n.e.c.	(X)	-	-	(D)	-	-	-	-	(X)
3315-	Steel wire and related products	(X)	-	-	-	-	(D)	-	-	(X)
3351-	Copper rolling and drawing	(X)	-	-	-	-	(D)	-	-	(X)
3369-	Nonferrous castings, n.e.c.	(X)	-	-	-	-	(D)	-	-	(X)
3444-	Sheet metal work	(X)	(D)	1.9	(D)	(D)	-	-	-	(X)
3452-	Bolts, nuts, rivets, and washers	(X)	-	-	(D)	(D)	-	-	-	(X)
3469-	Metal stampings, n.e.c.	(X)	-	(D)	(D)	(D)	-	-	-	(X)
3494-	Valves and pipe fittings	(X)	(D)	-	-	(D)	-	-	(D)	(X)
3499-	Fabricated metal products, n.e.c.	(X)	(D)	(D)	-	(D)	-	(D)	-	(X)
3511-	Turbines and turbine generator sets	(X)	-	-	18.0	-	-	-	-	(X)
3519-	Internal combustion engines, n.e.c.	(X)	-	-	(D)	-	-	-	-	(X)
3535-	Conveyors and conveying equipment	(X)	-	-	-	1.0	(D)	-	-	(X)
3541-	Machine tools, metal cutting types	(X)	-	-	(D)	-	(D)	-	-	(X)
3542-	Machine tools, metal forming types	(X)	-	-	-	-	7.1	-	-	(X)
3544-	Special dies, tools, jigs, and fixtures	(X)	-	-	3.0	(D)	(D)	-	-	(X)
3549-	Metalworking machinery, n.e.c.	(X)	-	-	-	(D)	48.6	-	(D)	(X)
3555-	Printing trades machinery	(X)	-	-	-	13.1	-	-	-	(X)
3559-	Special industry machinery, n.e.c.	(X)	-	-	(D)	-	-	-	(D)	(X)
3561-	Pumps and pumping equipment	(X)	-	-	(D)	-	-	-	-	(X)
3563-	Air and gas compressors	(X)	-	-	5.3	-	-	-	-	(X)
3564-	Blowers and fans	(X)	-	-	12.9	-	-	-	-	(X)
3566-	Speed changers, drives, and gears	(X)	-	-	(D)	-	-	-	-	(X)
3567-	Industrial furnaces and ovens	(X)	-	(D)	-	(D)	-	-	(D)	(X)
3573-	Electronic computing equipment	(X)	-	(D)	(D)	9.7	-	-	-	(X)
3599-	Machinery, except electrical, n.e.c.	(X)	-	(D)	1.5	(D)	-	-	(D)	(X)

See footnotes at end of table.

Table 5c-1. Industry-Product Analysis—Shipments by Product Class and Industry: 1982—Con.

[Million dollars. Table shows where products of an industry (referred to as primary and listed in table 6a) are made and what products are made by establishments classified in an industry. Read down an industry column to find what products are produced in an industry. Only those product groups that have at least \$2 million in shipments from establishments classified in one of industries included in this chapter are shown. Read across to determine where products of industries in this chapter are produced. To extent that some of primary products are made in industries not included in this chapter, value of such shipments is shown in "Other industries" column. Specified "Other industries" are listed in table 5c-2 if they account for more than \$5 million of products primary to this chapter. For meaning of abbreviations and symbols, see explanatory text. For explanation of terms, see appendixes]

1982 product code	Product group, product class, and miscellaneous receipts	All industries	Transformers (SIC 3612)	Switchgear and switchboard apparatus (SIC 3613)	Motors and generators (SIC 3821)	Industrial controls (SIC 3622)	Welding apparatus, electric (SIC 3623)	Carbon and graphite products (SIC 3624)	Electrical industrial apparatus, n.e.c. (SIC 3829)	Other industries
OTHER SHIPMENTS BY FOUR-DIGIT PRODUCT GROUP—Con.										
3643-	Current-carrying wiring devices	(X)	62.2	58.9	-	16.1	-	(D)	(D)	(X)
3644-	Noncurrent-carrying wiring devices	(X)	-	17.1	-	(D)	-	-	(D)	(X)
3646-	Commercial lighting fixtures	(X)	(D)	(D)	-	(D)	-	-	(D)	(X)
3647-	Vehicular lighting equipment	(X)	-	(D)	-	-	-	-	(D)	(X)
3648-	Lighting equipment, n.e.c.	(X)	-	12.3	(D)	.1	-	-	-	(X)
3661-	Telephone and telegraph apparatus	(X)	(D)	(D)	(D)	(D)	-	-	-	(X)
3662-	Radio and TV communication equipment	(X)	(D)	4.9	(D)	11.5	(D)	-	1.9	(X)
3674-	Semiconductors and related devices	(X)	-	(D)	(D)	-	-	-	(D)	(X)
3675-	Electronic capacitors	(X)	-	(D)	-	-	-	-	(D)	(X)
3678-	Electronic resistors	(X)	-	(D)	-	(D)	-	(D)	-	(X)
3677-	Electronic coils and transformers	(X)	4.9	(D)	-	(D)	-	-	.4	(X)
3678-	Electronic connectors	(X)	-	(D)	-	(D)	-	-	-	(X)
3679-	Electronic components, n.e.c.	(X)	(D)	64.6	4.1	4.4	-	-	(D)	(X)
3694-	Engine electrical equipment	(X)	-	-	31.0	(D)	-	-	-	(X)
3699-	Electrical equipment and supplies, n.e.c.	(X)	(D)	(D)	-	(D)	-	-	-	(X)
3728-	Aircraft equipment, n.e.c.	(X)	-	-	(D)	(D)	-	-	-	(X)
3811-	Engineering and scientific instruments	(X)	(D)	-	11.3	3.5	-	(D)	-	(X)
3823-	Process control instruments	(X)	-	-	-	14.6	-	-	-	(X)
3825-	Instruments to measure electricity	(X)	-	15.2	(D)	18.7	(D)	-	(D)	(X)
3829-	Measuring and controlling devices, n.e.c.	(X)	-	-	(D)	2.2	(D)	-	-	(X)
3841-	Surgical and medical instruments	(X)	11.7	-	-	(D)	-	-	-	(X)
3861-	Photographic equipment and supplies	(X)	-	-	-	-	-	-	(D)	(X)
3873-	Watches, clocks, and watchcases	(X)	(D)	-	(D)	-	-	-	-	(X)
MISCELLANEOUS RECEIPTS										
93000 00	Receipts for work done for others on their materials	(X)	6.4	5.2	100.3	9.5	1.7	3.9	3.3	(X)
99980 00	Miscellaneous receipts, including receipts for repair work, sales of scrap and refuse, etc.	(X)	-	(D)	2.5	.2	-	(D)	13.2	(X)
99980 13	Sales of scrap and refuse	(X)	3.2	(D)	15.4	2.7	(X)	-	-	(X)
99980 61	Receipts for repair work	(X)	(X)	1.8	38.9	39.2	5.5	-	(X)	(X)
99980 98	Other miscellaneous receipts, including receipts for repair work, etc.	(X)	17.1	(D)	11.7	11.4	7.2	(X)	(X)	(X)
99989 00	Sales of products bought and resold without further manufacture, processing, or assembly at establishment	(X)	41.5	272.8	96.4	164.7	25.5	(D)	33.2	(X)

Table 5c-2. Industry-Product Analysis—Other Industries With Shipments of Primary Products: 1982

[Million dollars. Table is a continuation of table 5c-1 and shows where products of industries in this chapter (referred to as primary products and listed in table 6a) are made. To extent that some of primary products are made in industries not included in this chapter, value of such shipments is shown in "Other industries" column of table 5c-1. Specified "Other industries" are listed in this table if they account for more than \$5 million of products primary to this chapter. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

1982 product code	Other industries	Value	1982 product code	Other industries	Value
3612-	TRANSFORMERS		3621-	MOTORS AND GENERATORS—Con.	
	3677 Electronic coils and transformers	7.6		3632 Household refrigerators and freezers	(D)
	3825 Instruments to measure electricity	(D)		3634 Electric housewares and fans	8.5
3613-	SWITCHGEAR AND SWITCHBOARD APPARATUS			3662 Radio and TV communication equipment	(D)
	3079 Miscellaneous plastics products	(D)		3679 Electronic components, n.e.c.	(D)
	3452 Bolts, nuts, rivets, and washers	(D)		3694 Engine electrical equipment	(D)
	3469 Metal stampings, n.e.c.	(D)	3622-	INDUSTRIAL CONTROLS	
	3494 Valves and pipe fittings	(D)		3079 Miscellaneous plastics products	(D)
	3643 Current-carrying wiring devices	57.2		3449 Miscellaneous metal work	(D)
	3644 Noncurrent-carrying wiring devices	(D)		3494 Valves and pipe fittings	37.4
3621-	MOTORS AND GENERATORS			3589 Service industry machinery, n.e.c.	9.5
	3494 Valves and pipe fittings	(D)		3643 Current-carrying wiring devices	53.1
	3511 Turbines and turbine generator sets	(D)		3644 Noncurrent-carrying wiring devices	(D)
	3519 Internal combustion engines, n.e.c.	521.7		3662 Radio and TV communication equipment	30.4
	3531 Construction machinery	(D)		3676 Electronic resistors	(D)
	3532 Mining machinery	(D)		3679 Electronic components, n.e.c.	17.6
	3537 Industrial trucks and tractors	(D)		3714 Motor vehicle parts and accessories	(D)
	3546 Power driven hand tools	(D)	3623-	WELDING APPARATUS, ELECTRIC	
	3561 Pumps and pumping equipment	(D)		3549 Metalworking machinery, n.e.c.	18.8
	3563 Air and gas compressors	(D)		3559 Special industry machinery, n.e.c.	5.8
	3564 Blowers and fans	(D)	3624-	CARBON AND GRAPHITE PRODUCTS	
	3566 Speed changers, drives, and gears	19.8		3592 Carburetors, pistons, rings, valves	(D)
	3568 Power transmission equipment, n.e.c.	(D)		3764 Space propulsion units and parts	(D)
	3585 Refrigeration and heating equipment	(D)	3629-	ELECTRICAL INDUSTRIAL APPARATUS, N.E.C.	
	3592 Carburetors, pistons, rings, valves	(D)		3675 Electronic capacitors	(D)
	3599 Machinery, except electrical, n.e.c.	(D)			

Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1982 and 1977

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 product code	Product	1982			1977		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
	TRANSFORMERS						
3612- —	Total	(NA)	(X)	2 772.6	(NA)	(X)	2 117.8
36122 —	Power and distribution transformers:						
36122 00	Power and distribution transformers:						
	As reported in the census of manufactures	53	(X)	1 554.0	(NA)	(X)	1 320.9
	As reported in the Current Industrial Report MA-36G, Transformers	(NA)	(X)	1 909.8	(NA)	(X)	(³)
	Distribution transformers, liquid-immersed, all voltages, and dry-type electric utility distribution transformers, excluding general purpose transformers:						
	Overhead type, single phase (liquid-immersed):						
36122 01	100 kVA or less	(NA)	720.7	345.3	19	1 082.9	365.6
36122 03	101 kVA to 500 kVA	(NA)	15.5	34.4	10	15.0	25.5
	Compartmentalized pad-mounted, single phase (liquid-immersed):						
36122 06	100 kVA or less	(NA)	100.2	107.8	12	216.8	136.6
36122 07	101 kVA to 500 kVA	(NA)	3.3	7.1			
	Subsurface and subway types, single phase (liquid-immersed):						
36122 08	100 kVA or less	(NA)	8.6	12.2	10	(S)	31.5
36122 09	101 kVA or more	(NA)	.3	1.0			
	Three phase transformers 500 kVA or less (liquid-immersed) (all voltages):						
36122 12	Overhead type	(NA)	5.4	11.7	7	20.1	18.5
36122 13	Compartmentalized pad-mounted	(NA)	28.7	135.2	(NA)	(⁴)	(⁴)
36122 15	Subsurface and subway types	(NA)				(⁴)	(⁴)
36122 35	Network transformers, all rating, excluding network protectors	(NA)	1.2	23.8	(NA)	43.1	492.9
	Single phase, pad-mounted (dry):						
36122 16	50 kVA or less	(NA)	49.3	9.8	(⁵)	(⁵)	(⁵)
36122 17	51 kVA to 500 kVA	(NA)	.8	.8	(⁵)	(⁵)	(⁵)
	Three phase, pad-mounted (dry):						
36122 18	500 kVA or less	(NA)	25.0	21.6	(⁵)	(⁵)	(⁵)
36122 20	501 kVA or more	(NA)			(⁵)	(⁵)	(⁵)

See footnotes at end of table.

Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1982 and 1977—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 product code	Product	1982			1977		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
	TRANSFORMERS—Con.						
36122 — 36122 00	Power and distribution transformers —Con. Power and distribution transformers —Con. Small power transformers, single and three phase (all voltages):						
36122 21	Compartmentalized pad-mounted transformers and subsurface underground and conventional subway type transformers, self-cooled equivalent ratings of 501 kVA (liquid-immersed): 501 kVA to 2,500 kVA ----- number-----	(NA)	8.0	67.6	13	5.5	41.2
36122 23	Conventional transformers and autotransformers, with and without load-tap changing, primary unit substation transformers and single circuit unit substations (liquid- immersed): 501 to 2,500 kVA ----- do-----	(NA)	1.6	28.6	11	2.0	22.7
36122 25	2,501 to 10,000 kVA ----- do-----	(NA)	.2	22.9	12	2.0	72.3
36122 27	Liquid-immersed conventional transformers and autotransformers, without load-tap changing, primary unit substation transformers and single circuit unit substations (liquid): 2,501 to 10,000 kVA ----- do-----	(NA)	1.3	70.8			
36122 29	Dry type small power transformers, self-cooled equipment ratings of 501 kVA or more, single and three phase high voltage 601 volts and larger; conventional transformers, primary unit substation transformers and core and coil units ----- do-----	(NA)	1.9	22.5	(NA)	(⁶)	\$11.4
36122 32	Secondary unit substation transformers, liquid-immersed, all kVA ratings (based on self-cooled nameplate rating), single and three phased, all high voltages, and low voltages below 1000 volts: Mineral oil and non/low flammability fluids ----- do-----	(NA)	2.7	48.2	9	*3.5	41.7
36122 33	Secondary unit substation transformers, dry type, single and three phase all kVA ratings, all high voltages, and low voltages below 1,000 volts. Units sold with or without secondary switching equipment, but with a flange or throat for connection to such equipment (for dry type, also include core and coil units for ultimate use in secondary unit substations) ----- do-----	(NA)	2.5	40.8	(NA)	(S)	37.4
36122 37	Large power transformers, liquid-immersed, self-cooled equivalent ratings (based on self-cooled nameplate ratings), 10,001 kVA or more, single and three phased, all high and low voltages. Conventional transformers and autotransformers, with and without load-tap changing primary unit substation transformers and regulating transformers: 10,001 kVA, OA-30,000 kVA(30,000 kVA, top FOA): With load-tap changing ----- do-----	(NA)	.5	130.1			
36122 39	Without load-tap changing ----- do----- 30,001 kVA, OA(50,001 kVA, top FOA) to 100,000 kVA, OA(167,000 kVA, top FOA): With load-tap changing ----- do-----	(NA)	.4	87.5			
36122 41	Without load-tap changing ----- do-----	(NA)	.1	43.5	(NA)	1.4	388.4
36122 42	Without load-tap changing ----- do-----	(NA)	.1	36.3			
36122 43	100,001 kVA, OA (167,001 kVA, top FOA) or more: With load-tap changing ----- do-----	(NA)	-	32.2			
36122 44	Without load-tap changing ----- do-----	(NA)	.2	164.2			
36122 0A	Power and distribution, transformers, n.s.k. ----- do-----	(NA)	(X)	-	(NA)	(X)	35.2
24 — 36124 00	Fluorescent lamp ballasts: Fluorescent lamp ballasts: As reported in the census of manufactures ----- As reported in the Current Industrial Report MQ-36C, Fluorescent Lamp Ballasts -----	12	(X)	312.1	9	(X)	210.7
36124 61	Uncorrected power factor type (less than 85 percent power factor): Rapid start ----- millions-----	(NA)	(X)	310.6	(NA)	(X)	205.6
36124 62	Switch start: 20 watt and less ----- do-----	(NA)	3.2	11.5	(NA)	(⁶)	(⁶)
36124 63	21 to 40 watt ----- do-----	(NA)	12.4	18.0	(NA)	11.3	8.5
36124 65	More than 40 watt ----- do-----	(NA)		-	(NA)	1.3	2.4
36124 66	All other ----- do-----	(NA)	2.0	5.7	(NA)	(⁶)	(⁶)
36124 67	Corrected power factor type (85 percent or more power factor): Slimline and instant start: Two lamp 96T12 and two lamp 72T12 ----- do-----	(NA)	6.4	57.0	(NA)	6.7	37.6
36124 68	Other slimline and instant start ----- do-----	(NA)	.9	8.8	(NA)	.9	6.4
36124 71	Rapid start: Two lamp 40 watt ----- do-----	(NA)	26.9	144.5	(NA)	27.4	92.0
36124 72	All other rapid start: 800 to 1000 mA ----- do-----	(NA)	1.9	35.1	(NA)	2.0	24.6
36124 73	1500 mA ----- do-----	(NA)	.4	11.8	(NA)	.6	10.8
36124 74	Other rapid start ----- do-----	(NA)	2.4	14.8	(NA)	2.1	9.8
36124 75	Switch start: 20 watt and less ----- do-----	(NA)	(D)	(D)	(NA)	(D)	(D)
36124 76	21 to 40 watt ----- do-----	(NA)	(Z)	.8	(NA)	(D)	(D)
36124 77	Two lamp 40 watt ----- do-----	(NA)		-	(NA)	.1	.8
36124 78	Other 21 to 40 watt ----- do-----	(NA)			(NA)	(D)	(D)
36124 79	More than 40 watt ----- do-----	(NA)	(X)	(D)	(NA)	(D)	(D)
36124 0A	All other ----- do----- Fluorescent lamp ballasts, n.s.k. ----- do-----	(NA)	(X)	-	(NA)	(X)	-

See footnotes at end of table.

Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1982 and 1977—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 product code	Product	1982			1977		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
	TRANSFORMERS—Con.						
38125 — 36125 00	Specialty transformers (except fluorescent lamp ballasts): Specialty transformers (except fluorescent lamp ballasts): As reported in the census of manufactures ----- As reported in the Current Industrial Report MA-36G, Transformers -----	73 (NA)	(X) (X)	545.1 559.1	(NA) (NA)	(X) (X)	342.8 (³)
36125 01	Open core and coil units (excluding machine tool control transformers) and all units end-bell enclosed (250 VA or less) ----- millions..	(NA)	4.8	43.1	12	3.8	13.2
36125 03	Machine tool control transformers ----- do..	(NA)	.9	24.5	12	(⁷)	(⁷)
36125 21	Luminous tube transformers for hot and cold operation (1,000 volts or more) ----- do..	(NA)	1.3	22.8	2	(⁷)	(⁷)
38125 31	Ignition, including oil- and gas-furnace ignition applications, but excluding internal combustion engine ignition ----- do..	(NA)			6	72.9	736.2
	High intensity discharge lamp transformers, also known as ballasts:						
36125 44	Mercury vapor lamp ----- do..	(NA)	1.2	19.5	5	1.1	16.1
36125 45	Metal halide lamp ----- do..	(NA)	.8	16.3	5	.4	7.9
36125 46	High pressure sodium vapor lamp ----- do..	(NA)	1.4	41.4	5	.6	14.9
	Instrument transformers:						
	Indoor and outdoor current transformers:						
36125 81	600 volts or less ----- do..	(NA)	.6	23.2	(⁸)	(X)	(⁸)
36125 82	601 to 15,000 volts ----- do..	(NA)	(Z)	7.9	(⁸)	(X)	(⁸)
36125 83	15,001 to 69,000 volts ----- do..	(NA)	(Z)	5.4	(⁸)	(X)	(⁸)
36125 84	69,001 volts or more ----- do..	(NA)	(Z)	10.3	(⁸)	(X)	(⁸)
	Indoor and outdoor voltage transformers:						
36125 85	600 volts or less ----- do..	(NA)	.3	4.7	(⁸)	(X)	(⁸)
36125 86	601 to 15,000 volts ----- do..	(NA)	.1	29.2	(⁸)	(X)	(⁸)
38125 87	15,001 to 69,000 volts ----- do..	(NA)			(⁸)	(X)	(⁸)
36125 88	69,001 volts or more ----- do..	(NA)			(⁸)	(X)	(⁸)
	Commercial, institutional, and industrial general purpose transformers, all voltages, single and three phase (excluding electric utility distribution transformers):				46	(X)	449.1
38125 71	Single and three phase all enclosed general purpose and buck-boost transformers and open core and coil units not included in product codes 36125 01 and 36125 03, 3 kVA or less, all voltages ----- do..	(NA)	.5	21.5	22	3.1	52.8
36125 72	Single and three phase, 3.01 kVA to 15 kVA:						
36125 73	600 volts or less ----- do..	(NA)	.2	34.8	10	.1	14.0
	601 volts or more ----- do..	(NA)	(Z)	.7			
	Single phase 15.01 kVA to 100 kVA:						
36125 74	600 volts or less ----- do..	(NA)	(Z)	10.6	13	2.7	31.8
36125 75	601 volts to 5,000 volts ----- do..	(NA)	(S)	(⁹)			
36125 76	5,001 volts or more ----- do..	(NA)	(S)	3.5			
	Three phase 15.01 kVA to 100 kVA:						
36125 77	600 volts or less ----- do..	(NA)	.1	40.1	14	3.5	15.7
36125 78	601 volts to 5,000 volts ----- do..	(NA)	(Z)	.7			
36125 79	5,001 volts or more ----- do..	(NA)	(Z)	.4			
36125 80	Single phase 100.01 kVA or more, 600 volts ----- do..	(NA)	(Z)	1.3	14	3.5	15.7
	Single phase 100.01 kVA to 500 kVA:						
36125 82	601 volts to 5,000 volts ----- do..	(NA)	(Z)	.8			
36125 85	5,001 volts or more ----- do..	(NA)	(Z)	1.4	14	3.5	15.7
36125 86	Three phase 100.01 kVA or more, 600 volts or less ----- do..	(NA)	(Z)	30.9			
	Three phase 100.01 kVA to 500 kVA:						
36125 88	601 volts to 5,000 volts ----- do..	(NA)	(Z)	4.1	14	3.5	15.7
36125 91	5,001 volts or more ----- do..	(NA)	(Z)	2.7			
36125 93	Voltage regulating transformers, except transmission and distribution voltage regulators ----- do..	(NA)	.6	57.0	(¹⁰)	(¹⁰)	(¹⁰)
36125 96	All other transformers, including saturable core reactors ----- do..	(NA)	7.0	100.5	(¹⁰)	(¹⁰)	(¹⁰)
36125 0A	Specialty transformers (except fluorescent lamp ballasts), n.s.k. -----	(NA)	(X)	-	(NA)	(X)	34.2
38127 — 36127 00	Power regulators, boosters, reactors, and other transformers, including parts and accessories: Power regulators, boosters, reactors, and other transformers, including parts and accessories: As reported in the census of manufactures ----- As reported in the Current Industrial Report MA-36G, Transformers -----	37 (NA)	(X) (X)	243.2 224.1	(NA) (NA)	(X) (X)	168.1 (³)
36127 11	Transmission and distribution voltage regulators, single and three phase induction voltage regulators, and step voltage regulators ----- millions..	(NA)	(X)	83.0	5	(S)	34.2
36127 31	Reactor and special purpose transformers, liquid-immersed and dry type, all voltages and kVA's such as: reactors, furnace transformers, rectifier transformers, locomotive transformers, grounding transformers, ground fault neutralizers, mobile transformers, mobile unit substation, and integral single-circuit unit substations -----	(NA)	(X)	55.7	17	(X)	66.5
38127 78	Parts (including renewal and repair parts), subassemblies, and accessories for all transformers -----	(NA)	(X)	85.4	14	(X)	57.9
38127 0A	Power regulators, boosters, reactors, and other transformers, including parts and accessories, n.s.k. -----	(NA)	(X)	-	(NA)	(X)	9.5
38120 00	Transformers, n.s.k., typically for establishments with 10 employees or more (see note) -----	(NA)	(X)	85.4	(NA)	(X)	53.6
36120 02	Transformers, n.s.k., typically for establishments with less than 10 employees (see note) -----	(NA)	(X)	32.8	(NA)	(X)	21.7

See footnotes at end of table.

Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1982 and 1977—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 product code	Product	1982			1977		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
	SWITCHGEAR AND SWITCHBOARD APPARATUS						
3613—	Total -----	(NA)	(X)	4 760.6	(NA)	(X)	3 298.4
36132 —	Power circuit breakers, all voltages:						
36132 00	Power circuit breakers, all voltages: As reported in the census of manufactures -----	39	(X)	394.6	25	(X)	261.2
	As reported in the Current Industrial Report MA-36A, Switchgear, Switchboard Apparatus, Relays, and Industrial Controls -----	(NA)	(X)	388.3	(NA)	(X)	260.4
36132 15	Power circuit breakers (sold separately) for use in metal-clad switchgear (oil and oilless), more than 1,000 volts, including parts -----	(NA)	(X)	67.0	(NA)	(X)	39.5
36132 20	Power circuit breakers, free standing, oil and oilless, from 15.5 kV through 800 kV and above, including parts -----	(NA)	(X)	160.3	(NA)	(X)	120.3
36132 25	Power circuit breakers, free standing (sold separately) in individual enclosures -----	(NA)	(X)	49.1	(NA)	(X)	30.9
36132 30	All other power circuit breakers (sold separately), oil and oilless, network protectors and automatic circuit reclosers, including parts -----	(NA)	(X)	111.9	(NA)	(X)	69.7
36133 —	Low voltage panelboards and distribution boards and other switching and interrupting devices:						
36133 00	Low voltage panelboards and distribution boards and other switching and interrupting devices, 1000 volts or less: As reported in the census of manufactures -----	170	(X)	1 299.5	121	(X)	878.2
	As reported in the Current Industrial Report MA-36A, Switchgear, Switchboard Apparatus, Relays, and Industrial Controls -----	(NA)	(X)	1 244.2	(NA)	(X)	873.6
36133 11	Panelboards (including enclosing cabinets):						
36133 12	Fusible (including combination switch fuse) -----	(NA)	(X)	96.2	(NA)	(X)	79.3
	Circuit breaker -----	(NA)	(X)	213.5	(NA)	(X)	132.7
36133 15	Distribution switchboards:						
36133 17	Fusible -----	(NA)	(X)	91.5	(NA)	(X)	60.7
36133 19	Circuit breaker -----	(NA)	(X)	124.5	(NA)	(X)	97.0
	Other (including theater switchboards) -----	(NA)	(X)	23.7	(NA)	(X)	25.0
	Switches (except switches commonly known as snap, toggle, and rotary switches; and switch devices intended primarily to be used with electric motor controls):						
36133 21	Knife switches, enclosed:						
36133 22	Heavy duty -----	(NA)	(X)	83.0	(NA)	(X)	58.0
	General duty -----	(NA)	(X)	40.0	(NA)	(X)	34.7
36133 24	Load centers:						
	Enclosed fusible, service entrance, and branch circuit cutouts -----	(NA)	(X)	7.3	(NA)	(X)	3.7
36133 26	Circuit breaker type -----	(NA)	(X)	172.8	(NA)	(X)	173.1
36133 32	Grouped metering panels (combinations of two meters or more and related switching units with overcurrent protection associated with each meter, including accessory components; excluding single socket load combinations) -----	(NA)	(X)	27.3	(NA)	(X)	14.0
36133 33	Other switches (excluding snap, bolted, toggle, push, etc.; including open knife switches, motor contact, motor disconnect, meter service equipment other than metermounting, and test devices) -----	(NA)	(X)	94.9	(NA)	(X)	56.2
36133 98	Other low voltage switchgear apparatus -----	(NA)	(X)	269.6	(NA)	(X)	139.2
36134 —	Fuses and fuse equipment, less than 2300 volts, except power distribution cut-outs:						
36134 00	Fuses and fuse equipment, less than 2300 volts, except power distribution cut-outs: As reported in the census of manufactures -----	31	(X)	280.6	25	(X)	201.6
	As reported in the Current Industrial Report MA-36A, Switchgear, Switchboard Apparatus, Relays, and Industrial Controls -----	(NA)	(X)	274.6	(NA)	(X)	188.9
36134 31	Nonrenewable plug fuses -----	(NA)	(X)	14.8	(NA)	(X)	20.9
36134 51	Nonrenewable cartridge fuses -----	(NA)	(X)	122.7	(NA)	(X)	83.3
36134 71	Renewable plug and cartridge fuses (including renewable links) -----	(NA)	(X)	10.2	(NA)	(X)	11.2
36134 93	Other fuses and open fuse material (including cut-outs, clips, base, etc.) -----	(NA)	(X)	126.7	(NA)	(X)	73.5
36135 —	Molded case circuit breakers, 1000 volts or less:						
36135 00	Molded case circuit breakers, 1000 volts or less: As reported in the census of manufactures -----	28	(X)	711.1	23	(X)	492.0
	As reported in the Current Industrial Report MA-36A, Switchgear, Switchboard Apparatus, Relays, and Industrial Controls -----	(NA)	(X)	710.9	(NA)	(X)	511.2
36135 11	Industrial type, with or without ground fault detection capability, assembled as complete units in supporting and enclosing housing of insulating materials; with or without accessories or attachments -----	(NA)	(X)	334.5	(NA)	(X)	210.9
36135 12	Residential or light duty type, with or without ground fault detection capability, as an integral part—primarily for load center application—assembled as complete units in supporting and enclosing housing of insulating materials -----	(NA)	(X)	216.1	(NA)	(X)	208.7
36135 31	Individually enclosed industrial type, excluding panelboards and busway plugs -----	(NA)	(X)	10.7	(NA)	(X)	13.2

See footnotes at end of table.

Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1982 and 1977—Con.

(Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text)

1982 product code	Product	1982			1977		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
	SWITCHGEAR AND SWITCHBOARD APPARATUS —Con.						
36135 — 36135 00	Molded case circuit breakers, 1000 volts or less —Con. Molded case circuit breakers, 1000 volts or less —Con. As reported in the Current Industrial Report MA-36A, Switchgear, Switchboard Apparatus, Relays, and Industrial Controls —Con. Other molded case circuit breakers:						
36135 91	Marine and navy type -----	(NA)	(X)	25.9	(NA)	(X)	5.3
36135 92	Aircraft and aerospace -----	(NA)					
36135 93	Automotive -----	(NA)					
36135 94	Electronic -----	(NA)	(X)	123.7	(NA)	(X)	73.1
36135 95	All other types -----	(NA)					
36136 — 36136 00	Duct, including plug-in units and accessories, 1000 volts or less: Duct, including plug-in units and accessories, 1000 volts or less: As reported in the census of manufactures ----- As reported in the Current Industrial Report MA-36A, Switchgear, Switchboard Apparatus, Relays, and Industrial Controls ----- Busways ----- Trolley-type and lighting distribution duct -----	27	(X)	162.5	18	(X)	88.5
36136 11	Busways -----	(NA)	(X)	157.8	(NA)	(X)	84.0
36136 31	Trolley-type and lighting distribution duct -----	(NA)	(X)	157.8	(NA)	(X)	77.2
36138 — 36138 00	Relays: Relays: As reported in the census of manufactures ----- As reported in the Current Industrial Report MA-36A, Switchgear, Switchboard Apparatus, Relays, and Industrial Controls -----	63	(X)	497.1	(NA)	(X)	(11)
36138 31	Relays (switchgear type, excluding industrial control type); regulators and miscellaneous switchboard devices (for sale separately) ----- Relays, control circuit: A.c. and d.c. magnetic control circuit relays (excluding overload relays) ----- Starter accessories (including overload relays) -----	(NA)	(X)	487.3	(NA)	(X)	440.5
36138 41	Relays, control circuit: A.c. and d.c. magnetic control circuit relays (excluding overload relays) -----	(NA)	(X)	100.0	(NA)	(X)	1196.4
36138 44	Starter accessories (including overload relays) -----	(NA)	(X)	330.6	(NA)	(X)	313.0
36139 — 36139 00	Switchgear, except ducts and relays: Switchgear, except ducts and relays: As reported in the census of manufactures ----- As reported in the Current Industrial Report MA-36A, Switchgear, Switchboard Apparatus, Relays, and Industrial Controls -----	141	(X)	1 230.5	(NA)	(X)	111 197.7
36139 07	Automatic and manual control panels (generators, transformers, feed-controls, etc.) -----	(NA)	(X)	1 212.0	(NA)	(X)	748.6
36139 09	Metal-clad switchgear (using power circuit breakers, oil and oilless); all voltages more than 1,000 volts up to and including 38kV, excluding load interrupter switchgear -----	(NA)	(X)	302.6	(NA)	(X)	80.0
36139 10	Metal-enclosed load interrupter switchgear assemblies, all voltages, including parts -----	(NA)	(X)	287.9	(NA)	(X)	254.5
36139 13	Metal-enclosed low-voltage power circuit breaker switchgear assemblies, 1,000 volts or less, including parts and excluding load interrupter switchgear -----	(NA)	(X)	68.7	(NA)	(X)	41.6
36139 17	Metal-enclosed bus when sold separately, more than 1,000 volts, including isolated, segregated, nonsegregated, and cable bus ----- Power switching equipment (including attachments, auxiliaries, bus supports, and accessories, but excluding power fuses sold separately) 2,300 volts or more. Also includes single phase circuit reclosers: Outdoor, excluding structures ----- Indoor -----	(NA)	(X)	144.1	(NA)	(X)	88.0
36139 41	Outdoor, excluding structures -----	(NA)	(X)	44.5	(NA)	(X)	30.3
36139 45	Indoor -----	(NA)	(X)	180.2	(NA)	(X)	100.5
36139 51	Power fuses and fuse links for 2,300 volts or more, a.c. service (excluding distribution cutouts) -----	(NA)	(X)	10.5	(NA)	(X)	6.2
36139 81	Power and ground connectors generally used in substation construction -----	(NA)	(X)	32.8	(NA)	(X)	38.3
36139 91	Overhead transmission and distribution connectors (clamps, taps, terminals, and splices) -----	(NA)	(X)	9.1	(NA)	(X)	8.4
36139 93	Transmission and distribution connectors, n.e.c., (including underground deadends, hotline taps, stirrups, repair sleeves, etc.) -----	(NA)	(X)	88.6	(NA)	(X)	67.9
36139 83	Distribution cutouts -----	(NA)	(X)	43.0	(NA)	(X)	32.9
36130 00	Switchgear and switchboard apparatus, n.s.k., typically for establishments with 10 employees or more (see note) -----	(NA)	(X)	129.2	(NA)	(X)	108.5
36130 02	Switchgear and switchboard apparatus, n.s.k., typically for establishments with less than 10 employees (see note) -----	(NA)	(X)	55.6	(NA)	(X)	70.8

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Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1982 and 1977—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 product code	Product	1982			1977		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
	MOTORS AND GENERATORS						
3621- —	Total	(NA)	(X)	6 724.6	(NA)	(X)	4 976.2
36211 —	Fractional horsepower motors:						
36211 00	Fractional horsepower motors, excluding hermetics:						
	As reported in the census of manufactures	133	(X)	2 518.7	120	(X)	1 956.3
	As reported in the Current Industrial Report MA-36H, Motors and Generators	(NA)	(X)	2 503.5	(NA)	(X)	1 999.5
36211 01	Automobile accessory motors (include all accessory motors, such as heater, convertible top, automatic window, etc.; exclude starting motors and generators)	(NA)			(NA)		
	..... millions	(NA)	45.4	546.2	(NA)	64.9	459.9
	Aircraft end use motors (excluding generators):						
36211 03	A.c. do ..	(NA)	.2	36.7	(NA)	.1	16.2
36211 04	D.c. do ..	(NA)	.2	42.8	(NA)	.1	14.1
36211 05	Toy motors, all sizes (including those for advertising displays, etc.)	(NA)			(NA)		
36211 07	Clock-type synchronous and subsynchronous timing motors	(NA)	13.9	40.0	(NA)	21.6	50.6
	Universal:						
	Cased motors (punching diameter):						
36211 08	Less than 2 1/8 inch diameter	(NA)			(NA)	(12)	(12)
36211 09	2 1/8 inch diameter or more, but less than 2 7/16 inch diameter	(NA)	8.0	44.0	(NA)	124.0	1214.2
36211 10	2 7/16 inch diameter or more, but less than 2 7/8 inch diameter	(NA)			(NA)	2.9	11.8
36211 11	2 7/8 inch diameter or more, but less than 3 3/16 inch diameter	(NA)	1.1	14.5	(NA)	1.5	13.6
36211 12	3 3/16 inch diameter or more, but less than 3 11/16 inch diameter	(NA)	.7	18.7	(NA)	.3	7.8
36211 13	3 11/16 inch diameter or more, but less than 4 3/8 inch diameter	(NA)	2.5	51.0	(NA)	3.0	45.8
36211 14	4 3/8 inch diameter or more	(NA)					
	Uncased motors (punching diameter) (consisting of stator, rotor, and brush holder mechanisms, without end shields, bearings, or conventional frame, usually called motor parts):						
36211 15	Less than 2 1/8 inch diameter	(NA)					
36211 16	2 1/8 inch diameter or more, but less than 2 7/16 inch diameter	(NA)	1.1	10.0	(NA)	6.0	18.0
36211 17	2 7/16 inch diameter or more, but less than 2 7/8 inch diameter	(NA)					
36211 18	2 7/8 inch diameter or more, but less than 3 3/16 inch diameter	(NA)	.7	14.3	(NA)	.8	5.7
36211 19	3 3/16 inch diameter or more, but less than 3 11/16 inch diameter	(NA)	2.9	5.2	(NA)	(13)	(13)
36211 20	3 11/16 inch diameter or more, but less than 4 3/8 inch diameter	(NA)			(NA)	(13)	(13)
36211 21	4 3/8 inch diameter or more	(NA)	(Z)	1.4	(NA)	13.6	136.6
	Direct current motors and generators (case diameter) (exclude automotive generators and accessories, including starting motors.):						
36211 22	Less than 3 inch diameter (up to 1/70 hp)	(NA)	8.2	62.4	(NA)	5.9	55.0
36211 23	3 inch diameter or more, but less than 4 5/8 inch diameter (1/70 hp or more, but less than 1/20 hp)	(NA)	2.3	63.0	(NA)	2.4	45.1
36211 24	4 5/8 inch diameter or more, but less than 6 inch diameter (1/20 hp or more, but less than 1/6 hp)	(NA)	.3	54.4	(NA)	.1	20.0
36211 25	6 inch diameter or more, but less than 7 1/8 inch diameter (1/6 hp or more, but less than 1 hp)	(NA)	.1	13.1	(NA)	.1	10.4
36211 26	7 1/8 inch diameter or more, but less than 9 inch diameter (1/6 hp or more, but less than 1 hp)	(NA)	(Z)	5.3	(NA)	-	2.9
	Alternating current:						
	Skeleton type shaded pole motors (shaded pole motors generally square or rectangular in configuration and whose stator OD is exposed. Normally this type motor has two bearings mounted in a metal strip rather than a conventional type end shield. This category does not include round motors with conventional type end shields which happen to have some of the stator laminations exposed.):						
36211 31	Less than 2 3/4 inch diameter:						
36211 33	Less than 5 mhp	(NA)	7.2	29.5	(NA)	10.2	31.0
	5 mhp or more	(NA)	3.5	9.7	(NA)	5.0	12.6
36211 35	2 3/4 inch diameter or more:						
36211 37	Less than 5 mhp	(NA)	7.5	28.4	(NA)	4.4	14.1
36211 39	5 mhp or more, but less than 35 mhp	(NA)			(NA)		
	35 mhp or more	(NA)	7.6	24.0	(NA)	5.9	14.9
	Conventional type shaded pole motors (case diameter):						
36211 41	Less than 1 1/2 inch diameter:						
	All horsepower ratings built in this diameter	(NA)					
	1 1/2 inch diameter or more, but less than 2 1/2 inch diameter:						
36211 42	Less than 5 mhp	(NA)	6.6	38.8	(NA)	(14)	(14)
36211 43	5 mhp or more, but less than 16 mhp	(NA)					
36211 44	16 mhp or more	(NA)					

See footnotes at end of table.

Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1982 and 1977—Con.

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1982 product code	Product	1982			1977		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
	MOTORS AND GENERATORS—Con.						
36211 —	Fractional horsepower motors —Con.						
36211 00	Fractional horsepower motors, excluding hermetics —Con. As reported in the Current Industrial Report MA-36H, Motors and Generators —Con. Alternating current —Con. Conventional type shaded pole motors (case diameter) —Con.						
	2 1/2 inch diameter or more, but less than 3 3/4 inch in diameter:						
36211 45	Less than 16 mhp ----- millions..	(NA)	10.0	73.6	(NA)	1420.2	1490.4
36211 46	16 mhp or more, but less than 1/20 hp ----- do..	(NA)	4.6	47.0	(NA)	7.8	37.7
36211 47	1/20 hp or more, but less than 1/10 hp ----- do..	(NA)			(NA)		
36211 48	1/10 hp or more ----- do..	(NA)	3.9	40.0	(NA)	3.2	17.7
	3 3/4 inch diameter or more, but less than 4 1/2 inch diameter:						
36211 49	Less than 16 mhp ----- do..	(NA)			(NA)		
36211 51	16 mhp or more, but less than 1/20 hp ----- do..	(NA)	.5	9.0	(NA)	(15)	(15)
36211 52	1/20 hp or more, but less than 1/10 hp ----- do..	(NA)			(NA)		
36211 53	1/10 hp or more ----- do..	(NA)	.3	7.3	(NA)	151.1	1513.0
	4 1/2 inch diameter or more, but less than 5 1/4 inch diameter:						
36211 54	Less than 1/20 mhp ----- do..	(NA)	.1	1.8	(NA)	2.2	28.4
36211 55	1/20 hp or more, but less than 1/10 hp ----- do..	(NA)	3.1	29.9	(NA)	1.6	16.6
36211 56	1/10 hp or more, but less than 1/6 hp ----- do..	(NA)	.9	14.4	(NA)	.5	6.9
36211 57	1/6 hp or more, but less than 1/4 hp ----- do..	(NA)			(NA)		
36211 58	1/4 hp or more ----- do..	(NA)	.3	5.7	(NA)	.3	4.8
36211 59	5 1/4 inch or more, but less than 9 inch diameter, all hp ratings ----- do..	(NA)	.5	12.0	(NA)	1.7	24.1
	Other A.c. motors (case diameter) including subfractional and fractional, synchronous and subsynchronous timing motors, other than clock type:						
	Less than 2 1/2 inch diameter:						
36211 61	All hp ratings ----- do..	(NA)	.9	34.3	(NA)	.3	16.3
	2 1/2 inch or more, but less than 3 3/4 inch diameter:						
36211 62	Less than 16 mhp ----- do..	(NA)	.1	4.6	(NA)	.1	3.7
36211 63	16 mhp or more, but less than 1/20 hp ----- do..	(NA)	.4	12.5	(NA)	.7	15.6
36211 64	1/20 hp or more, but less than 1/10 hp ----- do..	(NA)			(NA)		
36211 65	1/10 hp or more, but less than 1/4 hp ----- do..	(NA)	1.0	29.6	(NA)	1.4	27.1
36211 66	1/4 hp or more ----- do..	(NA)			(NA)		
	3 3/4 inch or more, but less than 4 3/8 inch diameter:						
36211 67	Less than 16 mhp ----- do..	(NA)			(NA)		
36211 68	16 mhp or more, but less than 1/20 hp ----- do..	(NA)	.1	6.1	(NA)	.1	4.7
36211 69	1/20 hp or more, but less than 1/10 hp ----- do..	(NA)			(NA)		
36211 70	1/10 hp or more, but less than 1/6 hp ----- do..	(NA)	1.2	50.7	(NA)	1.4	37.1
36211 71	1/6 hp or more ----- do..	(NA)			(NA)		
	4 3/8 inch or more, but less than 5 3/8 inch diameter:						
36211 72	Less than 1/20 hp ----- do..	(NA)	(Z)	2.2	(NA)	(NA)	(NA)
36211 73	1/20 hp or more, but less than 1/10 hp ----- do..	(NA)	.1	2.5	(NA)	.1	2.0
36211 74	1/10 hp or more, but less than 1/6 hp ----- do..	(NA)	1.2	28.8	(NA)	1.3	20.0
36211 75	1/6 hp or more, but less than 1/3 hp ----- do..	(NA)			(NA)		
36211 76	1/3 hp or more ----- do..	(NA)	1.1	27.2	(NA)	.8	18.1
	5 3/8 inch or more, but less than 6 inch diameter:						
36211 81	Less than 1 hp ----- do..	(NA)	15.4	473.1	(NA)	16.4	319.1
	6 inch or more, but less than 7 1/8 inch diameter:						
36211 83	Less than 1 hp ----- do..	(NA)			(NA)		
36211 85	7 1/8 inch or more, but less than 9 inch diameter: Less than 1 hp ----- do..	(NA)	14.2	419.1	(NA)	20.3	426.1
36212 —	Integral horsepower motors and generators, except for land transportation equipment:						
36212 00	Integral horsepower motors and generators other than for land transportation equipment, excluding hermetics: As reported in the census of manufactures ----- As reported in the Current Industrial Report MA-36H, Motors and Generators -----	66 (NA)	(X) (X)	1 454.2 1 409.8	53 (NA)	(X) 4 639.5	1 163.0 1 140.1
	Integral horsepower motors and generators, other than for land transportation equipment. Note applying to e.c. and d.c. motors, 200 horsepower or less: The horsepower shown is for open type frame at a speed of 1800 r.p.m. Motors at other speeds and enclosed should be converted to equivalent ratings at 1800 r.p.m.: Integral horsepower motors (exclude cranking motors for internal combustion engines, propulsion motors for land transportation, and motors mounted on the same shaft as arc welding generators and hermetics.):						
36212 01	Aircraft and space motors (including e.c. and d.c. but excluding generators), all integral hp ratings -- thousands..	(NA)	5.0	6.4	(NA)	9.4	5.0
36212 11	Alternating current: Single phase, all hp ratings ----- do..	(NA)	444.3	72.8	(NA)	706.5	61.8

See footnotes at end of table.

Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1982 and 1977—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 product code	Product	1982			1977		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
	MOTORS AND GENERATORS—Con.						
36212 —	Integral horsepower motors and generators, except for land transportation equipment —Con.						
36212 00	Integral horsepower motors and generators other than for land transportation equipment, excluding hermetics —Con. As reported in the Current Industrial Report MA-36H, Motors and Generators —Con.						
	Integral horsepower motors and generators, other than for land transportation equipment. Note applying to a.c. and d.c. motors, 200 horsepower or less: The horsepower shown is for open type frame at a speed of 1800 r.p.m. Motors at other speeds and enclosed should be converted to equivalent ratings at 1800 r.p.m. —Con.						
	Integral horsepower motors (exclude cranking motors for internal combustion engines, propulsion motors for land transportation, and motors mounted on the same shaft as arc welding generators and hermetics.) —Con.						
	Alternating current —Con.						
	Polyphase, induction:						
36212 21	1 to 5 hp ----- thousands..	(NA)	'946.9	'150.3	(NA)	1 337.5	142.4
36212 22	5.1 to 20 hp ----- do..	(NA)	'344.0	'130.5	(NA)	398.9	107.8
36212 23	21 to 50 hp ----- do..	(NA)	'116.1	'116.9	(NA)	139.4	92.8
36212 26	51 to 125 hp ----- do..	(NA)	45.2	'109.5	(NA)	54.8	90.8
36212 27	126 to 200 hp ----- do..	(NA)	'16.4	'79.6	(NA)	18.3	71.5
36212 28	201 to 500 hp ----- do..	(NA)	'7.0	89.8	(NA)	8.5	75.1
36212 29	More than 500 hp ----- do..	(NA)	'3.0	132.8	(NA)	4.4	175.7
	Synchronous motors (salient pole only):						
36212 31	450 r.p.m. or less (all hp ratings) ----- do..	(NA)	.4	46.1	(NA)	.6	43.7
36212 32	More than 450 r.p.m. (all hp ratings) ----- do..	(NA)			(NA)		
	Alternating current motors by case diameter:						
36212 03	5 3/8 inch diameter or more, but less than 6 inch ----- do..	(NA)	'1 465.4	'84.0	(NA)	1 785.6	56.7
36212 05	8 inch diameter or more, but less than 7 1/8 inch ----- do..	(NA)			(NA)		
36212 07	7 1/8 inch diameter or more, but less than 9 inch ----- do..	(NA)			(NA)		
	Direct current motors and generators (excluding all arc welding generators, battery charging generators for internal combustion engines, and generators used as an integral part of land transportation equipment):						
36212 41	1 to 5 hp (3/4 to 4 kW) ----- do..	(NA)	'49.1	'40.5	(NA)	36.8	20.9
36212 42	5.1 to 20 hp (4.1 to 15 kW) ----- do..	(NA)	'20.0	'39.0	(NA)	20.7	31.4
36212 43	21 to 50 hp (16 to 40 kW) ----- do..	(NA)	11.1	'41.6	(NA)	6.4	20.5
36212 46	51 to 200 hp (41 to 150 kW) ----- do..	(NA)	7.0	60.5	(NA)	3.1	15.1
36212 47	201 to 500 hp (151 to 400 kW) ----- do..	(NA)	'6	10.8	(NA)	.6	13.2
36212 48	More than 500 hp (more than 400 kW) ----- do..	(NA)	.3	17.8			
	Alternating current generators (excluding arc welding generators, generators used as an integral part of land transportation equipment, steam, gas, and hydraulic turbine driven generators, and aircraft and space generators):						
36212 51	450 r.p.m. and slower speeds, all kW ratings ----- do..	(NA)	10.5	6.5	(NA)	12.4	2.1
	More than 450 r.p.m.:				(NA)		
36212 53	3/4 to 5 kW ----- do..	(NA)	'8.7	'10.5	(NA)	10.5	8.7
36212 54	5.1 to 15 kW ----- do..	(NA)			(NA)		
36212 55	15.1 to 50 kW ----- do..	(NA)	'7.7	'23.8	(NA)	10.7	17.4
36212 56	50.1 to 150 kW ----- do..	(NA)	4.4	16.3	(NA)	4.4	11.8
36212 57	150.1 to 400 kW ----- do..	(NA)	3.4	19.8	(NA)	4.0	19.2
36212 59	More than 400 kW ----- do..	(NA)	8.0	103.8	(NA)	9.2	56.7
36213 —	Land transportation motors, generators, and control equipment and parts:						
36213 00	Land transportation motors, generators, and control equipment and parts:						
	As reported in the census of manufactures -----	24	(X)	460.2	(NA)	(X)	205.7
	As reported in the Current Industrial Report MA-36H, Motors and Generators -----	(NA)	(X)	'428.3	(NA)	(X)	198.8
36213 11	Railway motors and generators, including those used for control purposes (for trolley cars, trolley coaches, rapid transit cars, trolley locomotives, third-rail locomotives, multiple unit cars for railway service, and mining locomotives) and parts and supplies ----- thousands..	(NA)	16.6	50.2	(NA)	18.3	18.3
36213 31	Motors and generators, including those used for control purposes; gasoline-electric and diesel-electric buses, trucks, locomotives, rail cars, and parts and supplies ----- do..	(NA)	'253.1	'231.8	(NA)	191.5	122.3
36213 51	All other land transportation motors, including industrial trucks, mining locomotives, and other transportation equipment and parts ----- do..	(NA)			(NA)		
36213 98	Other electrical apparatus for land transportation equipment ----- do..	(NA)	(X)	146.4	(NA)	(X)	58.2

See footnotes at end of table.

Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1982 and 1977—Con.

(Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text)

1982 product code	Product	1982			1977			
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹		
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)	
	MOTORS AND GENERATORS—Con.							
38214 —	Prime mover generator sets, except steam or hydraulic turbine:							
38214 00	Prime mover generator sets, except steam or hydraulic turbine:							
	As reported in the census of manufactures -----	37	(X)	961.5	36	(X)	643.9	
	As reported in the Current Industrial Report MA-36H, Motors and Generators -----	(NA)	(X)	951.8	(NA)	(X)	649.3	
	Generator set units except steam, gas, and water turbine sets:							
	Gas and/or gasoline engine driven generator sets:							
	A.c. and d.c. output:							
38214 03	Less than 3/4 kW ----- thousands-----	(NA)	}	102.9	(NA)	211.7	80.5	
38214 04	3/4 to 5 kW ----- do-----	(NA)		65.8	(NA)			
38214 05	5.1 kW to 15 kW ----- do-----	(NA)		23.8	(NA)	41.3	46.5	
38214 07	15.1 kW to 35 kW ----- do-----	(NA)		3.9	(NA)	5.4	11.1	
38214 08	35.1 kW to 100 kW ----- do-----	(NA)		1.9	(NA)	1.1	6.3	
38214 09	100.1 kW or more ----- do-----	(NA)		17.2	(NA)	.2	6.1	
	Diesel engine-driven generator sets, a.c. and d.c. output:							
38214 41	Less than 14 kW ----- do-----	(NA)		17.2	(NA)	9.3	22.0	
38214 42	14.1 kW to 50 kW ----- do-----	(NA)		5.9	(NA)	5.5	33.3	
38214 43	50.1 kW to 100 kW ----- do-----	(NA)		3.9	(NA)	3.3	36.9	
38214 24	100.1 kW to 200 kW ----- do-----	(NA)		3.3	(NA)	5.0	58.7	
38214 25	200.1 kW to 400 kW ----- do-----	(NA)		4.3	(NA)	5.6	99.8	
38214 26	400.1 kW to 600 kW ----- do-----	(NA)		1.7	(NA)	1.8	65.8	
38214 27	600.1 kW to 800 kW ----- do-----	(NA)		.8	(NA)	.5	34.2	
38214 28	800.1 kW to 1,000 kW ----- do-----	(NA)		1.1	(NA)	.5	45.3	
38214 29	1,000.1 kW to 2,000 kW ----- do-----	(NA)		.1	(NA)	.1	28.5	
38214 30	2,000.1 kW to 3,000 kW ----- do-----	(NA)	}					
38214 31	3,000.1 kW or more ----- do-----	(NA)						
	Dual fuel (oil and gas) engine generator sets, a.c. and d.c. output:							
38214 52	Less than 2,000 kW ----- do-----	(NA)			.2	(NA)	.2	76.3
38214 53	2,000 kW or more ----- do-----	(NA)			52.0			
38214 75	Other generator set units, including wind-driven (except steam and water turbine sets and motor generator sets) ----- do-----	(NA)	-	-	(NA)	-	-	
38217 —	Motor generator sets and other rotating equipment, including hermetics (fractional):							
38217 00	Fractional motor generator sets and other rotating equipment, including hermetics:							
	As reported in the census of manufactures -----	33	(X)	264.5	34	(X)	274.5	
	As reported in the Current Industrial Report MA-36H, Motors and Generators -----	(NA)	(X)	261.9	(NA)	(X)	256.8	
38217 21	Motor generator sets:							
	Fractional horsepower, a.c. and d.c. output (less than 3/4 kW) ----- thousands-----	(NA)	14.2	3.8	(NA)	11.9	2.5	
38217 53	Other rotating equipment:							
	Synchros, servos, rate generators, resolvers, and combinations, fractional only (including subfractional less than 1/600 hp motors) -----	(NA)	(X)	64.4	(NA)	(X)	71.7	
38217 57	Synchro-type components, fractional only -----	(NA)	(X)	(18)	(NA)	(X)	1.2	
38217 97	All hermetic motors 5.5 inch stator core diameter and smaller ----- thousands-----	(NA)	8 065.4	148.5	(NA)	15 258.8	158.1	
38217 98	All other rotating equipment, fractional -----	(NA)	(X)	145.1	(NA)	(X)	23.3	
38218 —	Motor generator sets and other rotating equipment, including hermetics (integral):							
38218 00	Integral motor generator sets and other rotating equipment, including hermetics:							
	As reported in the census of manufactures -----	29	(X)	379.3	37	(X)	288.1	
	As reported in the Current Industrial Report MA-36H, Motors and Generators -----	(NA)	(X)	332.9	(NA)	(X)	275.2	
38218 11	Synchronous converters and double current generators, integral only ----- thousands-----	(NA)	1.5	5.5	(NA)	.7	2.0	
	Integral horsepower:							
	A.c. output, based on the rating of the largest d.c. generator:							
38218 32	3/4 to 150 kW ----- do-----	(NA)	3.9	39.6	(NA)	4.1	22.6	
38218 33	More than 150 kW ----- do-----	(NA)	.2	19.1	(NA)	.2	4.9	
	D.c. output, based on the rating of the largest d.c. generator:							
38218 34	3/4 to 170 kW ----- do-----	(NA)	}	47.8	(NA)	4.6	49.8	
38218 38	More than 170 kW ----- do-----	(NA)						
38218 97	All hermetic motors more than 5.5 inch stator core diameter ----- do-----	(NA)	4 959.2	191.2	(NA)	6 725.7	176.7	
38218 98	All other rotating equipment, Integral -----	(NA)	(X)	30.8	(NA)	(X)	19.4	
38219 —	Parts and supplies for motors, generators, and motor generator sets, except for land transportation equipment:							
38219 00	Parts and supplies for motors, generators, and motor generator sets, except for land transportation equipment -----	78	(X)	510.6	76	(X)	354.0	
38210 00	Motors and generators, n.s.k., typically for establishments with 20 employees or more (see note) -----	(NA)	(X)	138.4	(NA)	(X)	63.4	
38210 02	Motors and generators, n.s.k., typically for establishments with less than 20 employees (see note) -----	(NA)	(X)	37.2	(NA)	(X)	27.3	

See footnotes at end of table.

Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1982 and 1977—Con.

(Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text)

1982 product code	Product	1982			1977		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
	INDUSTRIAL CONTROLS						
3622—	Total	(NA)	(X)	4 376.1	(NA)	(X)	2 429.1
36221 —	Specific purpose industrial controls:						
36221 00	Specific purpose industrial controls:						
	As reported in the census of manufactures	270	(X)	1 406.7	(NA)	(X)	(¹⁷)
	As reported in the Current Industrial Report MA-36A, Switchgear, Switchboard Apparatus, Relays, and Industrial Controls	(NA)	(X)	1 325.8	(NA)	(X)	898.9
36221 45	U.S. Coast Guard, Navy, and Marine auxiliary controls and accessories	(NA)	(X)	91.0	(NA)	(X)	65.2
36221 47	Metal mill control and accessories (all voltages)	(NA)	(X)	82.3	(NA)	(X)	63.7
36221 48	Crane and hoist controls, constant and adjustable voltage (including operators' desks and stations)	(NA)	(X)	29.4	(NA)	(X)	23.1
36221 49	Definite purpose contactors and starters (600 volts and less)	(NA)	(X)	61.9	(NA)	(X)	30.3
	Machine tool applications:						
	Controls for numerically controlled machine tools:						
36221 51	Positioning type	(NA)	(X)	14.0	(NA)	(X)	29.5
36221 55	Continuous path type	(NA)	(X)	139.1	(NA)	(X)	98.0
36221 59	Digital readout systems, including dial or plugboard type	(NA)	(X)	35.0	(NA)	(X)	4.3
36221 65	Machine tool controls other than numerically controlled machines	(NA)	(X)	65.4	(NA)	(X)	28.3
36221 71	Programmable controllers (sold separately)	(NA)	(X)	366.2	(NA)	(X)	356.5
36221 78	Other specific or special purpose a.c. and d.c. controllers, other definite purpose devices	(NA)	(X)	441.5	(NA)	(X)	
36222 —	General purpose industrial controls:						
36222 00	General purpose industrial controls:						
	As reported in the census of manufactures	238	(X)	2 171.8	(NA)	(X)	(¹⁷)
	As reported in the Current Industrial Report MA-36A, Switchgear, Switchboard Apparatus, Relays, and Industrial Controls	(NA)	(X)	2 063.1	(NA)	(X)	1 493.9
36222 12	A.c. full voltage starters 1,000 volts or less (excluding controls for packaged adjustable speed drives and synchronous motor starters)	(NA)	(X)	283.9	(NA)	(X)	244.3
36222 13	A.c. contactors, 1,000 volts or less (excluding controls for packaged adjustable speed drives and synchronous motor field control)	(NA)	(X)	62.2	(NA)	(X)	43.8
36222 14	A.c. reduced voltage controls, 1,000 volts or less (excluding synchronous motor starters)	(NA)	(X)	26.1	(NA)	(X)	21.0
36222 15	Synchronous motor starters, 1,000 volts or less (including both full and reduced voltage)	(NA)	(X)	1.2	(NA)	(X)	1.1
36222 16	Motor control centers, 1,000 volts or less	(NA)	(X)	214.9	(NA)	(X)	175.9
36222 18	Starters and contactors for squirrel cage and wound rotor and synchronous and nonsynchronous motors, more than 1,000 to 7,200 volts, air break and oil immersed	(NA)	(X)	66.0	(NA)	(X)	53.0
36222 21	Brakes and clutches	(NA)	(X)	36.8	(NA)	(X)	63.3
36222 31	Limit switches	(NA)	(X)	84.3	(NA)	(X)	(¹⁸)
36222 42	Pilot circuit devices, such as interval timers, etc. (exclude relays and limit switches)	(NA)	(X)	129.5	(NA)	(X)	197.9
36222 44	Pushbuttons and pushbutton stations but excluding operators' desks and stations	(NA)	(X)	163.2	(NA)	(X)	109.1
36222 81	Rheostats and resistors (except for electronic applications) sold separately, n.e.c.	(NA)	(X)	41.5	(NA)	(X)	26.7
36222 96	Controls for packaged adjustable speed drives (including electronic and nonelectronic and operators' desks and stations)	(NA)	(X)	270.4	(NA)	(X)	187.4
36222 97	All other general industry devices and systems	(NA)	(X)	702.9	(NA)	(X)	1 370.8
36223 —	Parts for industrial controls:						
36223 00	Parts for industrial controls:						
	As reported in the census of manufactures	93	(X)	344.5	(NA)	(X)	172 342.5
	As reported in the Current Industrial Report MA-36A, Switchgear, Switchboard Apparatus, Relays, and Industrial Controls	(NA)	(X)	343.1	(NA)	(X)	171.3
36220 00	Industrial controls, n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	(X)	344.3	(NA)	(X)	—
36220 02	Industrial controls, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	(X)	108.8	(NA)	(X)	86.6
	WELDING APPARATUS, ELECTRIC						
3623—	Total	(NA)	(X)	1 231.8	(X)	(X)	1 035.0
36231 —	Arc welding machines, components, and accessories, except electrodes (excluding stud welding equipment)	(NA)	(X)	511.8	(NA)	(X)	407.8
	Arc welding machines:						
	Alternating current transformer arc welders:						
36231 14	300 amps. or less	9	(S)	27.1	11	374.3	64.7
36231 16	More than 300 amps.	10	*1.0	20.8	10	(S)	5.8
	Direct current arc welders:						
36231 31	Generators only	2			3		
36231 32	Rectifier types, including a.c./d.c.	10	(S)	137.7	11	11.0	99.3

See footnotes at end of table.

Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1982 and 1977—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 product code	Product	1982			1977		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
	WELDING APPARATUS, ELECTRIC—Con.						
36231 —	Arc welding machines, components, and accessories, except electrodes (excluding stud welding equipment) —Con. Arc welding machines —Con. Direct current arc welders —Con. Complete units only:						
36231 33	Engine driven ----- thousands-----	5	41.1	79.6	3	67.7	74.4
36231 35	Motor driven ----- do-----	4	4.3	5.5	3	13.2	9.7
	Components and accessories for arc welding machines (except electrodes):						
36231 52	Automatic and semiautomatic wire drive apparatus and related accessories (excluding special purpose automatic welding machines) -----	12	(X)	37.8	8	(X)	29.3
36231 53	Special purpose automatic welding apparatus -----	12	(X)	14.5	11	(X)	24.9
36231 54	Automatic and semiautomatic welding torches, guns and cables, and related accessories -----	13	(X)	50.8	9	(X)	29.7
36231 56	Circuit welding accessories (including electrode holders, ground clamps, cable connectors, cables sold separately, etc.) -----	7	(X)	22.6	10	(X)	14.1
36231 57	Positioning and manipulating equipment (including turn rolls, head and tail stock, weld head manipulators, seamers, moving carriages, etc.) -----	15	(X)	34.1	9	(X)	17.1
36231 59	All other components and accessories for arc welding machinery, excluding welding rods and electrodes -----	21	(X)	73.9	18	(X)	35.5
36231 00	Arc welding machines, components, and accessories, except electrodes (excluding stud welding equipment), n.s.k. -----	(NA)	(X)	7.2	(NA)	(X)	3.5
36232 —	Arc welding electrodes, metal -----	(NA)	(X)	469.6	(NA)	(X)	447.6
	Stick electrodes (including solid, cored, covered, and bare electrodes):						
36232 11	Mild steel ----- mil lb-----	10	371.9	180.3	14	412.4	133.6
36232 23	Low alloy steel, except hard surfacing ----- do-----	8	15.9	11.0	8	100.7	44.9
36232 25	Stainless steel (chromium, 4 percent or more) ----- do-----	11	12.7	32.7	10	**20.7	50.1
36232 31	Nonferrous, except hard surfacing ----- do-----	3	39.8	44.6	7	**7.3	24.1
36232 41	Hard surfacing, all types (includes tool steel) ----- do-----	11			10	(S)	12.2
	Coiled and spooled continuous wire electrodes for automatic arc welding and inert gas shielded arc welding (including electrodes for submerged arc welding, base wire):						
	Solid wire:						
36232 52	Mild steel ----- do-----	6	107.3	67.2	7	181.8	91.1
36232 54	Low alloy steel, except hard surfacing ----- do-----	3	(19)	(19)			
36232 55	Stainless steel (chromium, 4 percent or more) ----- do-----	5	9.8	23.2			
36232 58	Nonferrous, except hard surfacing ----- do-----	—	—	—			
36232 59	Hard surfacing, all types (including tool steel) ----- do-----	4	193.5	198.1			
	Cored wire (shielded):						
36232 61	Mild steel ----- do-----	7	90.2	71.0	7	125.0	65.4
36232 64	Other ----- do-----	3					
	Cored wire (not shielded):						
36232 65	Mild steel ----- do-----	2	16.0	16.7	6	58.7	25.3
36232 68	Other ----- do-----	4					
36232 00	Arc welding electrodes, metal, n.s.k. -----	(NA)	(X)	14.8	(X)	(X)	.9
36233 —	Resistance welders, components, accessories, and electrodes -----	(NA)	(X)	187.8	(NA)	(X)	136.9
36233 13	Spot and projection welders, single electrode ----- thousands-----	21	(S)	24.3	14	(S)	20.5
36233 23	Spot and projection welders, multielectrode ----- do-----	17	**1.1	74.8	15	(S)	35.5
36233 31	Seam welders ----- do-----	8	.2	11.7	5	(S)	12.1
36233 52	Other resistance welders, including flash, upset, and butt welders ----- do-----	13	(S)	39.2	4	(S)	38.8
36233 61	Resistance welder transformers (sold separately) ----- do-----	6	*8.3	7.5	6	(S)	10.4
36233 71	Resistance welder electrodes ----- mil lb-----	5					
36233 81	Resistance welder components and accessories, including electrode holders, etc. -----	14	(NA)	20.6	18	(X)	16.9
36233 00	Resistance welders, components, accessories, and electrodes, n.s.k. -----	(NA)	(X)	9.6	(NA)	(X)	2.7
36230 00	Welding apparatus, electric, n.s.k., typically for establishments with 10 employees or more (see note) -----	(NA)	(X)	43.7	(NA)	(X)	18.9
36230 02	Welding apparatus, electric, n.s.k., typically for establishments with less than 10 employees (see note) -----	(NA)	(X)	19.0	(NA)	(X)	23.8
	CARBON AND GRAPHITE PRODUCTS						
3624— —	Total -----	(NA)	(X)	900.9	(NA)	(X)	663.0
36241 —	Electrodes -----	(NA)	(X)	440.5	(NA)	(X)	362.0
	Electrodes for electric furnaces and electrolytic cell use, including paste for self-bake electrodes:						
36241 52	Carbon ----- mil lb-----	5	172.0	92.8	8	478.5	89.0
36241 58	Graphite ----- do-----	5	263.9	347.7	5	378.4	272.9
36241 00	Electrodes, n.s.k. -----	(NA)	(X)	—	(NA)	(X)	.1
36249 —	All other carbon and graphite products -----	(NA)	(X)	433.6	(NA)	(X)	293.1
36249 11	Brushes, contacts, and brush plates: Automotive (starter, generator, and alternator) brushes, including replacement brushes (automotive and light truck type, 6 to 12 volts, inclusive) and those that are coded (excluding automotive accessory brushes) -----	5	(X)	23.6	7	(X)	19.5

See footnotes at end of table.

Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1982 and 1977—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 product code	Product	1982			1977		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
	CARBON AND GRAPHITE PRODUCTS—Con.						
36249 —	All other carbon and graphite products —Con.						
36249 13	Brushes, contacts, and brush plates —Con.						
36249 15	Other fractional hp brushes and contacts, including replacement brushes (brushes 1/4 sq. inch or less in cross section or 1 1/2 in. long or less, including miniature brushes) and automotive accessory brushes	9	(X)	13.8	10	(X)	16.1
36249 17	Other industrial brushes and contacts (brushes more than 1/4 sq. in. in cross section and more than 1 1/2 in. long)	14	(X)	62.0	14	(X)	37.6
36249 88	Brush plates	5	(X)	4.5	5	(X)	3.8
	Carbon and graphite fibers	(21)	(X)	(21)	(20)	(X)	(20)
	All other carbon and graphite products, except refractories:						
36249 81	For electrical uses, including welding products (rods, plates, paste brazing and soldering tips); illuminating carbons; pile and rheostat resistance discs, plugs, power tube and rectifier parts, spectroscopic products, battery; electronic graphite; telephone components; resistance elements, etc. (excluding silver or other metal contacts)	15	(X)	117.2	2010	(X)	2059.4
36249 83	For mechanical uses, including one-piece seals, bushings and bearings, packing rings for steam seal, rotor vanes, and other uses where there is relative motion between two parts (excluding metallic oilless bearings)	20	(X)	87.2	2019	(X)	2049.9
36249 86	For aerospace uses, including unmachined stock and machined items not included elsewhere	6	(X)	15.3	208	(X)	2023.5
36249 98	For all other uses, including chemical, metallurgical, etc., except for electrodes	2122	(X)	21104.3	2013	(X)	2080.5
36249 00	All other carbon and graphite products, n.s.k.	(NA)	(X)	5.8	(NA)	(X)	2.8
36240 00	Carbon and graphite products, n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	(X)	17.2	(NA)	(X)	3.4
36240 02	Carbon and graphite products, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	(X)	9.6	(NA)	(X)	4.5
	ELECTRICAL INDUSTRIAL APPARATUS, N.E.C.						
3629 —	Total	(NA)	(X)	1 003.1	(NA)	(X)	699.1
36291 —	Capacitors for industrial use (except for electronic circuitry)	(NA)	(X)	190.0	(NA)	(X)	154.8
36291 11	Shunt and series power capacitors, units, and equipment, 1/2 kVA or more, and accessories for power factor correction and other low frequency a.c. applications — thousands..	5	(S)	107.2	7	(S)	64.5
36291 31	A.c. capacitors (except electrolytic):						
36291 35	General purpose, for motors, controls, etc. — millions..	5	(S)	44.5	7	(S)	89.4
36291 98	Capacitors for fluorescent lamp ballasts — do..	3	(D)	(22)	3	(S)	89.4
36291 00	Other capacitors, except for electronic circuitry	2	(S)	2235.9	2	(S)	1.0
36291 00	Capacitors for industrial use, n.s.k.	(NA)	(X)	2.4	(NA)	(X)	1.0
36292 —	Rectifying apparatus	(NA)	(X)	524.8	(NA)	(X)	310.2
	Rectifying (power conversion) apparatus (except for electronic circuitry), including all apparatus using semiconductor and/or electron tubes as power conversion means:						
	Semiconductor power conversion apparatus:						
36292 21	Semiconductor battery chargers:						
36292 25	Automotive — thousands..	8	(S)	40.0	17	*1 956.5	49.3
36292 31	Industrial and railroad — do..	9	(S)	30.6	11	**37.5	37.1
	Semiconductor power conversion apparatus for computers	4	(X)	(23)	7	(X)	39.5
	Semiconductor high-voltage power supplies in excess of 2 kV (excluding separate associated apparatus such as controls, capacitors, switchgear, etc.):						
36292 41	100 kW or less	15	(X)	98.0	10	(X)	37.5
36292 45	More than 100 kW	7	(X)	52.4	4	(X)	37.5
36292 49	All other a.c. to d.c. semiconductor power conversion apparatus	18	(X)	2394.6	12	(X)	142.5
36292 99	Other rectifying (power conversion) apparatus	25	(X)	199.8	13	(X)	4.3
36292 00	Rectifying apparatus, n.s.k.	(NA)	(X)	9.4	(NA)	(X)	4.3
36293 —	Electrical equipment for industrial use, n.e.c.	(NA)	(X)	213.0	(NA)	(X)	182.2
36293 13	Coil windings, electrical:						
36293 15	Aluminum and aluminum-base alloy — millions..	5	(S)	27.0	3	1.7	2.0
36293 31	Copper and copper-base alloy — do..	9	(S)	28.0	17	820.4	59.1
36293 99	Solenoids (except solenoid-actuated regulating valves) — do..	8	(S)	28.0	7	279.7	15.7
	Other miscellaneous electrical equipment for industrial use, n.e.c.	41	(X)	153.4	32	(X)	98.9
36293 00	Electrical equipment for industrial use, n.e.c., n.s.k.	(NA)	(X)	4.6	(NA)	(X)	6.5
36290 00	Electrical industrial apparatus, n.e.c., n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	(X)	33.8	(NA)	(X)	29.9
36290 02	Electrical industrial apparatus, n.e.c., n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	(X)	41.5	(NA)	(X)	22.0

See footnotes at end of table.

**Table 6a. Product and Product Classes—Quantity and Value of Shipments by All Producers:
1982 and 1977—Con.**

Note: In 1982 Census of Manufactures, data for establishments of small single-unit companies with up to 20 employees were estimated from administrative-record data rather than data actually collected from respondents. Employment cutoff used for administrative records for each industry and shipments figures are included in code ending with "002". In both 1982 and 1977 Censuses of Manufactures, products not completely identified on standard forms were coded in appropriate product class (five-digit) followed by "00" or to appropriate product group code (four-digit) followed by "000".

¹Data reported by all producers, not just those with shipments of \$100,000 or more.

²For some establishments, data have been estimated from central unit values which are based on quantity-value relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

³For 1977, detail product data were collected in the census of manufactures. Collection of this data began in 1979 in Current Industrial Report MA-36G, Transformers.

⁴For 1977, product codes 36122 13, 36122 15, and 36122 35 were combined to avoid disclosing data for individual companies.

⁵For 1977, product codes 36122 16, 36122 17, 36122 18, and 36122 20 were included with product code 36122 29.

⁶For 1977, product codes 36124 61, 36124 65, and 36124 66 were combined to avoid disclosing data for individual companies.

⁷For 1977, product codes 36125 03, 36125 21, and 36125 31 were combined to avoid disclosing data for individual companies.

⁸For 1977, product codes 36125 61, 36125 62, 36125 63, 36125 64, 36125 65, 36125 66, and 36125 67 were combined with product code 36125 68.

⁹For 1982, product codes 36125 75 and 36125 76 were combined to avoid disclosing data for individual companies.

¹⁰For 1977, product codes 36125 93 and 36125 96 were combined to avoid disclosing data for individual companies.

¹¹For 1977, product code 36138 31 was combined with product group 36139 00 in the census of manufactures. Comparable totals for prior years for 36138 00 and 36139 00, are not available.

¹²For 1977, product codes 36211 08 and 36211 09 were combined to avoid disclosing data for individual companies.

¹³For 1977, product codes 36211 19, 36211 20, and 36211 21 were combined to avoid disclosing data for individual companies.

¹⁴For 1977, product codes 36211 41, 36211 42, 36211 43, 36211 44, and 36211 45 were combined to avoid disclosing data for individual companies.

¹⁵For 1977, product codes 36211 49, 36211 51, 36211 52, and 36211 53 were combined to avoid disclosing data for individual companies.

¹⁶For 1982, product codes 36217 57 and 36217 98 are combined to avoid disclosing data for individual companies.

¹⁷Census product classes 36221 00, 36222 00, and 36223 00 originated in 1982. Comparable data are not available for prior years.

¹⁸For 1977, product code 36222 31 was included with product code 36222 97.

¹⁹For 1982, product code 36232 54 was combined with product code 36232 59 to avoid disclosing data for individual companies.

²⁰For 1977, carbon and graphite fibers (code 36249 88) were included in codes 36249 81, 36249 83, 36249 86, and 36249 98.

²¹For 1982, product code 36249 88 was combined with product code 36249 98 to avoid disclosing data for individual companies.

²²For 1982, product code 36291 35 was combined with product code 36291 98 to avoid disclosing data for individual companies.

²³For 1982, product code 36292 31 was combined with product code 36292 49 to avoid disclosing data for individual companies.

Table 6b. **Product Classes—Value of Shipments by All Producers for Specified States: 1982 and 1977**

[Million dollars. Product classes covered are those that are economically significant and whose production is geographically dispersed, provided dispersion is not approximated by data in table 2. Also, product classes are not shown if they are miscellaneous or "not specified by type" classes. Statistics for some States are withheld because they are either less than \$2 million in product class shipments or they disclose data for individual companies in 1982. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Product class and geographic area	1982 value of product shipments	1977 value of product shipments	Product class and geographic area	1982 value of product shipments	1977 value of product shipments
36122, POWER AND DISTRIBUTION TRANSFORMERS			36127, OTHER TRANSFORMERS, INCLUDING PARTS FOR ALL TRANSFORMERS—Con.		
United States	1 554.0	1 320.9	North Carolina	5.5	(AA)
Arkansas	39.8	(FF)	Ohio	24.2	17.0
California	109.2	59.2	Pennsylvania	30.6	(FF)
Connecticut	2.7	(NA)	South Carolina	9.2	(NA)
Florida	30.2	(EE)	Tennessee	7.8	(NA)
Georgia	197.7	(GG)	Texas	2.3	(BB)
Illinois	15.6	(NA)			
Indiana	76.9	(GG)			
Kentucky	34.8	(GG)	36132, POWER CIRCUIT BREAKERS, ALL VOLTAGES		
Louisiana	51.5	(FF)			
Massachusetts	92.3	(GG)	United States	394.6	261.2
Mississippi	74.7	51.9	New York	9.6	(AA)
Missouri	89.4	89.3	Texas	3.5	(NA)
New Jersey	3.9	(BB)			
New York	15.9	(EE)			
North Carolina	96.5	(GG)			
Ohio	34.2	(FF)			
Oregon	7.7	(FF)			
Pennsylvania	225.7	(GG)	36133, LOW VOLTAGE PANELBOARDS AND DISTRIBUTION BOARDS		
Tennessee	3.9	(AA)			
Texas	41.7	21.1	United States	1 299.5	878.2
Virginia	95.8	77.4	California	185.9	86.9
Washington	8.8	(BB)	Colorado	10.3	7.1
Wisconsin	204.7	156.5	Illinois	62.4	69.0
			Massachusetts	11.1	4.5
			Michigan	35.5	25.2
36124, FLUORESCENT LAMP BALLASTS			Missouri	35.2	28.8
United States	312.1	210.7	New Jersey	42.3	37.6
Arkansas	33.1	(NA)	New York	50.2	21.8
Illinois	135.7	52.4	Ohio	76.0	49.3
Indiana	2.4	(NA)	Pennsylvania	30.2	42.9
Kentucky	6.6	(FF)			
Mississippi	73.7	(GG)	South Carolina	27.9	(AA)
New Jersey	26.0	(FF)	Texas	79.1	54.6
Pennsylvania	5.4	(NA)	Washington	21.3	(EE)
Wisconsin	24.2	(FF)			
36125, SPECIALTY TRANSFORMERS			36135, MOLDED CASE CIRCUIT BREAKERS, 750 VOLTS OR LESS		
United States	545.1	342.8	United States	711.1	492.0
Alabama	12.4	(EE)	Georgia	8.5	(NA)
Arkansas	2.0	(AA)			
California	7.0	11.7			
Connecticut	15.0	(NA)			
Florida	15.8	(CC)	36136, DUCT, INCLUDING PLUG-IN UNITS, 750 VOLTS OR LESS		
Georgia	2.4	(NA)			
Illinois	76.0	71.7	United States	162.5	88.5
Indiana	49.7	(FF)	California	8.4	(NA)
Kentucky	6.1	(BB)	Ohio	55.6	(NA)
Massachusetts	25.0	(EE)	Texas	4.1	2.2
Michigan	17.4	(CC)			
Minnesota	6.6	(NA)			
Mississippi	10.1	(CC)			
New Hampshire	23.6	(FF)			
New Jersey	33.6	16.5			
New York	21.3	(EE)	36138, RELAYS, SWITCHGEAR		
North Carolina	47.0	10.3			
Ohio	12.4	(NA)	United States	497.1	(NA)
Pennsylvania	37.8	(FF)	California	13.2	(NA)
Tennessee	39.9	(NA)	Illinois	67.9	(NA)
Vermont	2.6	(AA)	Indiana	50.6	(NA)
Virginia	6.3	(CC)	New York	6.3	(NA)
Washington	3.1	(AA)	North Carolina	21.4	(NA)
Wisconsin	69.5	48.1	Pennsylvania	22.5	(NA)
36127, OTHER TRANSFORMERS, INCLUDING PARTS FOR ALL TRANSFORMERS			36139, SWITCHGEAR, EXCEPT DUCTS AND RELAYS		
United States	243.2	168.1	United States	1 230.5	(NA)
Alabama	21.4	(EE)	California	74.3	(NA)
Arkansas	5.4	(AA)	Connecticut	14.0	(NA)
California	33.0	10.7	Georgia	21.0	(NA)
Georgia	6.0	(CC)	Illinois	187.5	(NA)
Illinois	3.0	(BB)	Missouri	46.2	(NA)
Indiana	10.0	(CC)			
Massachusetts	39.8	(FF)	New Jersey	48.4	(NA)
Missouri	2.4	(AA)	New York	42.4	(NA)
New Jersey	9.7	15.4	Ohio	39.4	(NA)
New York	25.3	13.2	Pennsylvania	190.6	(NA)

See footnotes at end of table.

Table 6b. **Product Classes—Value of Shipments by All Producers for Specified States: 1982 and 1977—Con.**

[Million dollars. Product classes covered are those that are economically significant and whose production is geographically dispersed, provided dispersion is not approximated by data in table 2. Also, product classes are not shown if they are miscellaneous or "not specified by type" classes. Statistics for some States are withheld because they are either less than \$2 million in product class shipments or they disclose data for individual companies in 1982. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendices.]

Product class and geographic area	1982 value of product shipments	1977 value of product shipments	Product class and geographic area	1982 value of product shipments	1977 value of product shipments
36211, FRACTIONAL HORSEPOWER MOTORS			36221, SPECIFIC PURPOSE INDUSTRIAL CONTROLS		
United States -----	2 518.7	1 956.3	United States -----	1 406.7	(NA)
Arkansas -----	280.3	246.9	California -----	66.3	(NA)
California -----	44.5	18.0	Colorado -----	10.5	(NA)
Connecticut -----	57.7	32.8	Connecticut -----	14.0	(NA)
Illinois -----	192.3	114.9	Florida -----	47.4	(NA)
Indiana -----	264.2	256.3	Illinois -----	58.6	(NA)
Massachusetts -----	12.9	14.6	Indiana -----	20.0	(NA)
Michigan -----	99.4	111.0	Massachusetts -----	151.6	(NA)
Mississippi -----	63.1	69.3	Michigan -----	98.1	(NA)
Missouri -----	244.1	182.4	Minnesota -----	22.1	(NA)
New Jersey -----	23.8	(EE)	New Jersey -----	23.0	(NA)
New York -----	410.1	(GG)	New York -----	46.7	(NA)
Texas -----	23.8	(EE)	North Carolina -----	22.9	(NA)
Virginia -----	52.1	35.9	Ohio -----	225.6	(NA)
			Oregon -----	4.0	(NA)
			Pennsylvania -----	129.9	(NA)
			South Carolina -----	14.2	(NA)
			Texas -----	49.8	(NA)
			Wisconsin -----	124.0	(NA)
36212, INTEGRAL HORSEPOWER MOTORS AND GENERATORS					
United States -----	1 454.2	1 163.0	36222, GENERAL PURPOSE INDUSTRIAL CONTROLS		
Arkansas -----	154.1	76.6	United States -----	2 171.8	(NA)
California -----	55.1	59.9	Alabama -----	8.6	(NA)
Illinois -----	21.5	6.8	California -----	227.3	(NA)
Indiana -----	33.4	63.1	Colorado -----	2.7	(NA)
New Jersey -----	20.6	17.6	Connecticut -----	51.7	(NA)
Ohio -----	266.0	266.1	Florida -----	29.0	(NA)
Wisconsin -----	153.3	131.7	Illinois -----	232.2	(NA)
			Indiana -----	64.8	(NA)
36213, LAND TRANSPORTATION MOTORS AND GENERATORS			Iowa -----	36.2	(NA)
United States -----	460.2	205.7	Massachusetts -----	16.4	(NA)
Ohio -----	24.8	14.7	Michigan -----	40.5	(NA)
			Minnesota -----	5.0	(NA)
36214, PRIME MOVER GENERATOR SETS			New Jersey -----	52.2	(NA)
United States -----	961.5	643.9	New York -----	79.0	(NA)
California -----	48.8	48.1	North Carolina -----	273.5	(NA)
Pennsylvania -----	53.9	11.1	Ohio -----	95.3	(NA)
Wisconsin -----	73.2	58.3	Pennsylvania -----	83.0	(NA)
			Texas -----	87.6	(NA)
			Wisconsin -----	374.2	(NA)
36217, MOTOR GENERATOR SETS, FRACTIONAL			36223, PARTS FOR INDUSTRIAL CONTROLS		
United States -----	264.5	274.5	United States -----	344.5	(NA)
California -----	18.4	27.6	California -----	4.3	(NA)
Indiana -----	14.5	(AA)	Connecticut -----	2.8	(NA)
New York -----	20.7	(CC)	Illinois -----	31.3	(NA)
Tennessee -----	44.0	(FF)	Michigan -----	12.2	(NA)
			Minnesota -----	2.1	(NA)
			New Jersey -----	3.5	(NA)
36218, MOTOR GENERATOR SETS, INTEGRAL			New York -----	29.0	(NA)
United States -----	379.3	288.1	North Carolina -----	19.7	(NA)
Connecticut -----	4.8	(CC)	Ohio -----	21.6	(NA)
Kentucky -----	99.2	(GG)	Pennsylvania -----	17.9	(NA)
Minnesota -----	33.7	(EE)	South Carolina -----	5.0	(NA)
Ohio -----	31.1	38.0	Wisconsin -----	50.5	(NA)
Tennessee -----	42.7	22.7			
			36231, ARC WELDING MACHINES, COMPONENTS, AND ACCESSORIES		
36219, PARTS FOR MOTORS AND GENERATORS			United States -----	511.6	407.
United States -----	510.6	354.0	California -----	17.5	14.
Arkansas -----	52.6	(CC)	Illinois -----	28.4	(EE)
California -----	32.4	50.0	Michigan -----	31.6	23.
Indiana -----	4.8	5.4	Pennsylvania -----	5.2	(BE)
Michigan -----	15.3	15.1	Tennessee -----	4.8	(BE)
Missouri -----	20.2	(BB)			
New Jersey -----	4.0	4.7	36232, ARC WELDING ELECTRODES, METAL		
New York -----	33.9	(FF)	United States -----	469.6	447.
Ohio -----	60.5	(NA)	Michigan -----	9.0	(CC)
Pennsylvania -----	33.1	37.9	Ohio -----	233.5	217.
			Pennsylvania -----	68.6	91.

See footnotes at end of table.

Table 6b. Product Classes—Value of Shipments by All Producers for Specified States: 1982 and 1977—Con.

Million dollars. Product classes covered are those that are economically significant and whose production is geographically dispersed, provided dispersion is not approximated by data in table 2. Also, product classes are not shown if they are miscellaneous or "not specified by type" classes. Statistics for some States are withheld because they are either less than \$2 million in product class shipments or they disclose data for individual companies in 1982. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Product class and geographic area	1982 value of product shipments	1977 value of product shipments	Product class and geographic area	1982 value of product shipments	1977 value of product shipments
36233, RESISTANCE WELDERS, COMPONENTS, ACCESSORIES			36249, CARBON AND GRAPHITE PRODUCTS, N.E.C.—Con.		
United States -----	187.8	136.9	Pennsylvania -----	117.7	78.5
California -----	6.6	5.3	Texas -----	11.2	(BB)
Illinois -----	10.2	(EE)			
Michigan -----	121.8	79.7	36292, RECTIFYING APPARATUS		
New Jersey -----	4.9	(BB)	United States -----	524.8	310.2
Ohio -----	14.1	14.0	California -----	132.9	48.7
			Illinois -----	62.6	26.3
36241, ELECTRODES, CARBON AND GRAPHITE			Massachusetts -----	3.7	(BB)
United States -----	440.5	362.0	New Jersey -----	7.8	5.1
New York -----	132.7	109.7	Pennsylvania -----	20.8	25.5
36249, CARBON AND GRAPHITE PRODUCTS, N.E.C.			36293, ELECTRICAL EQUIPMENT FOR INDUSTRIAL USE, N.E.C.		
United States -----	433.8	293.1	United States -----	213.0	182.2
California -----	15.5	3.4	California -----	15.6	9.0
Illinois -----	12.3	(CC)	Connecticut -----	5.2	6.1
Michigan -----	23.3	22.1	Indiana -----	24.4	52.3
New York -----	29.2	(FF)	Massachusetts -----	7.7	(BB)
Ohio -----	55.5	62.9	Michigan -----	13.1	(CC)
			New Jersey -----	2.1	(NA)
			Pennsylvania -----	10.2	46.7
			Wisconsin -----	10.5	(AA)

Note: For 1977, the following value ranges (in million dollars) substitute for actual figures withheld to avoid disclosing data for individual companies: AA—less than \$2.0 but not 0; BB—\$2.0 to \$4.9; CC—\$5.0 to \$9.9; EE—\$10.0 to \$19.9; FF—\$20.0 to \$49.9; GG—\$50.0 or more.

Table 6c. Product Classes—Value Shipped by All Producers: 1982 and Earlier Years

Million dollars. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

1982 product code	Product class	1962	1961 ¹	1960 ¹	1979 ¹	1976 ¹	1977	1972	1967
612-	Transformers	2 772.6	2 999.4	2 765.1	2 537.6	2 371.1	2 117.6	1 436.1	1 161.0
6122	Power and distribution transformers	1 554.0	1 678.1	1 597.0	1 523.8	1 423.6	1 320.9	913.9	790.3
6124	Fluorescent lamp ballasts	312.1	336.6	331.4	318.9	231.2	210.7	160.6	116.6
6125	Specialty transformers	545.1	596.1	522.2	421.9	428.0	342.6	225.3	116.4
6127	Other transformers, including parts for all transformers	243.2	299.8	255.1	194.1	217.2	168.1	111.4	120.6
6120	Transformers, n.s.k.	116.2	66.7	59.3	79.3	71.1	75.3	24.9	14.9
613-	Switchgear and switchboard apparatus	4 760.8	4 826.6	4 477.0	4 074.8	3 682.2	3 296.4	2 058.8	1 598.5
6132	Power circuit breakers, all voltages	394.6	366.3	377.6	344.6	291.1	261.2	182.7	209.8
6133	Low voltage panelboards and distribution boards	1 299.5	1 314.9	1 248.9	1 170.2	1 039.1	878.2	539.0	378.0
6134	Fuses and fuse equipment, less than 2300 volts	260.6	292.2	306.0	236.8	189.3	201.6	99.7	69.2
6135	Molded case circuit breakers, 750 volts or less	711.1	634.7	707.6	647.6	614.7	492.0	283.0	170.2
6136	Duct, including plug-in units, 750 volts or less	162.5	176.7	172.3	142.5	104.6	88.5	65.7	62.8
6138	Relays, switchgear	497.1	1 718.7	1 550.0	1 428.5	1 343.5	1 197.7	820.5	849.4
6139	Switchgear, except ducts and relays	1 230.5	125.3	112.7	104.6	99.9	179.3	68.2	59.3
6130	Switchgear and switchboard apparatus, n.s.k.	184.8							
621-	Motors and generators	6 724.6	7 292.8	8 525.7	6 436.3	5 880.1	4 976.2	2 835.7	2 319.0
6211	Fractional horsepower motors	2 518.7	2 706.2	2 472.2	2 648.9	2 395.0	1 956.3	1 137.7	842.5
6212	Integral horsepower motors and generators	1 454.2	1 600.9	1 502.4	1 417.1	1 241.6	1 163.0	567.7	569.5
6213	Land transportation motors and generators	460.2	523.0	476.1	435.0	244.6	205.7	106.3	133.4
6214	Prime mover generator sets	961.5	1 131.5	907.3	776.2	802.6	643.9	247.3	232.7
6217	Motor generator sets, fractional	264.5	414.4	357.9	320.0	338.7	274.5	226.6	345.8
6218	Motor generator sets, integral	379.3	349.4	313.6	317.6	270.9	288.1	122.9	
6219	Parts for motors and generators	510.6	530.1	455.3	464.1	454.3	354.0	186.6	158.8
6210	Motors and generators, n.s.k.	175.6	37.4	40.7	57.3	112.2	90.7	36.4	36.6
622-	Industrial controls	4 378.1	4 368.6	3 976.5	3 463.9	2 997.0	2 429.1	1 249.6	1 671.4
6221	Specific purpose industrial controls	1 406.7							
6222	General purpose industrial controls	2 171.8	4 386.6	3 976.5	3 463.9	2 997.0	2 429.1	1 245.6	1 071.4
6223	Parts for industrial controls	344.5							
6220	Industrial controls, n.s.k.	453.1							
623-	Welding apparatus, electric	1 231.6	1 854.5	1 430.0	1 349.1	1 204.9	1 035.0	570.0	432.9
6231	Arc welding machines, components, and accessories	511.6	745.3	617.6	575.4	501.5	407.8	218.5	140.1
6232	Arc welding electrodes, metal	469.6	642.0	571.5	547.7	484.6	447.6	215.5	168.3
6233	Resistance welders, components, accessories	187.8	225.5	190.7	214.0	(S)	136.9	115.1	88.0
6230	Welding apparatus, electric, n.s.k.	62.7	41.7	50.2	12.0	(S)	42.7	20.9	37.9
624-	Carbon and graphite products	900.9	1 208.3	1 149.1	1 032.0	800.5	663.0	335.9	295.8
6241	Electrodes	440.5	761.9	726.2	635.1	464.4	362.0	136.9	147.8
6249	Carbon and graphite products, n.e.c.	433.6	422.5	396.9	389.0	326.7	293.1	193.8	140.7
6240	Carbon and graphite products, n.s.k.	26.8	23.9	26.0	7.9	9.4	7.9	5.2	7.5
629-	Electrical industrial apparatus, n.e.c.	1 003.1	986.1	955.5	907.8	850.0	699.1	442.9	398.5
6291	Capacitors for industrial use	190.0	247.7	253.9	221.7	202.2	154.8	112.4	112.5
6292	Rectifying apparatus	524.8	329.8	336.1	349.7	348.5	310.2	152.6	131.6
6293	Electrical equipment for industrial use, n.e.c.	213.0	339.0	298.4	262.9	237.1	182.2	145.9	135.1
6290	Electrical industrial apparatus, n.e.c., n.s.k.	75.3	69.6	67.2	73.5	62.2	51.9	32.0	19.4

¹Figures are estimates derived from a representative sample of manufacturing establishments canvassed in annual survey of manufactures and, therefore, may differ from results that would be obtained from a complete canvass of all manufacturing establishments. Standard errors associated with estimates are published in annual survey of manufactures volumes for this period.

Table 7. Materials Consumed by Kind: 1982 and 1977

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 material code	Material	1982		1977	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3612, TRANSFORMERS				
	Materials, parts, containers, and supplies -----	(X)	1 330.8	(X)	1 018.6
	Mill shapes and forms, except castings and forgings:				
	Carbon steel:				
331011	Bars and bar shapes ----- 1,000 s tons..	*17.4	9.7	6.3	2.3
331012	Sheet and strip ----- do..	*193.7	110.4	228.1	87.3
331013	Plates ----- do..	*40.2	19.7	35.1	11.7
331015	Structural shapes ----- do..	(S)	54.8	6.9	4.0
331055	All other carbon steel mill shapes and forms ----- do..	59.4	53.8	69.7	61.2
331020	Alloy steel, except stainless ----- do..	118.5	167.3	165.8	130.2
331031	Stainless steel mill shapes and forms ----- do..	*3.3	5.2	2.0	2.9
	Insulated wire and cable, except magnet wire:				
335792	Copper (quantity of copper content) ----- mil lb..	(S)	17.6	18.7	18.1
335793	Aluminum (quantity of aluminum content) ----- do..	(S)	1.9	(S)	1.4
335770	Magnet wire ----- do..	*72.2	95.1	*51.7	63.2
	Copper and copper-base alloy:				
335728	Bare wire (for electrical conduction only) ----- do..	72.6	38.7	19.4	18.3
335102	Rod, bar, and mechanical wire, including extruded and/or drawn shapes ----- do..	*30.2	19.7	*9.6	8.6
335143	Plate, sheet, and strip, including military cups and discs ----- do..	12.8	10.6	*2.8	3.0
335152	Pipe and tube ----- do..	(S)	1.4	.5	.6
	Aluminum and aluminum-base alloy:				
335301	Sheet, plate, and foil ----- do..	**157.4	24.2	29.2	22.6
335006	All other aluminum mill shapes and forms (wire, rolled rod and bar, powder, welded tubing, extruded shapes, etc.) ----- do..	(S)	31.3	26.6	21.3
333401	Aluminum and aluminum-base alloy refinery shapes ----- 1,000 s tons..	*.4	1.2	(S)	2.0
290001	Refined petroleum products (gasoline, jet fuel, lubricating oils and greases, asphalt, etc.) -----	(X)	64.5	(X)	27.9
326400	Porcelain, steatite, and other ceramic electrical products -----	(X)	29.1	(X)	22.6
260003	Paper and paperboard products, except paperboard boxes and containers -----	(X)	33.2	(X)	25.4
285101	Paints, varnishes, lacquers, shellacs, japans, enamels, and allied products ----- 1,000 gal..	**1 989.5	12.8	(X)	9.1
329300	Gaskets (all types) and asbestos packing -----	(X)	4.1	(X)	1.9
345001	Bolts, nuts, screws, rivets, and screw machine products -----	(X)	10.0	(X)	9.3
362001	Electrical capacitors, resistors, rheostats, and coil windings -----	(X)	79.3	(X)	36.2
364300	Current-carrying wiring devices -----	(X)	21.0	(X)	13.8
970099	All other materials and components, parts, containers, and supplies -----	(X)	330.8	(X)	321.0
971000	Materials, parts, containers, and supplies, n.s.k. ² -----	(X)	83.4	(X)	92.7
	INDUSTRY 3613, SWITCHGEAR AND SWITCHBOARD APPARATUS				
	Materials, parts, containers, and supplies -----	(X)	1 653.3	(X)	1 202.0
	Mill shapes and forms, except castings and forgings:				
	Carbon steel:				
331011	Bars and bar shapes ----- 1,000 s tons..	(S)	7.2	(S)	9.6
331012	Sheet and strip ----- do..	*174.5	92.5	214.0	77.9
331013	Plates ----- do..	**21.8	9.3	*12.6	4.7
331015	Structural shapes ----- do..	(S)	5.6	*8.8	3.4
331055	All other carbon steel mill shapes and forms ----- do..	(S)	5.3	(S)	5.3
331020	Alloy steel, except stainless ----- do..	*6.9	20.3	(S)	2.1
	Stainless steel:				
331033	Sheet and strip ----- do..	(S)	5.2	(S)	4.7
331050	All other stainless steel mill shapes and forms ----- do..	74.9	9.9	*.8	2.1
	Insulated wire and cable, except magnet wire:				
335792	Copper ----- mil lb..	(S)	11.0	(S)	1.0
335793	Aluminum ----- do..	(S)	8.5	6.2	7.6
335770	Magnet wire ----- do..	(S)	7.0	*7.2	7.4
	Copper and copper-base alloy:				
335728	Bare wire (for electrical conduction only) ----- do..	(S)	61.0	40.9	41.7
335102	Rod, bar, and mechanical wire, including extruded and/or drawn shapes ----- do..	(S)	17.2	17.0	17.9
335143	Plate, sheet, and strip, including military cups and discs ----- do..	(S)	3.5	(S)	3.2
335152	Pipe and tube ----- do..	(S)	9.3	*8.6	7.8
	Aluminum and aluminum-base alloy:				
335301	Sheet, plate, and foil ----- do..	(S)	23.2	**23.5	18.2
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc. ----- do..	*20.9	5.4	*1.6	1.9
335008	All other aluminum mill shapes and forms (wire, rolled rod and bar, powder, welded tubing, etc.) ----- do..	(S)	3.8	(X)	3.9
332011	Castings (rough and semifinished):				
	Iron (gray and malleable):				
	Purchased ----- 1,000 s tons..	(S)	3.8	(X)	3.9
332045	Produced and consumed ----- do..	(S)	(X)	(X)	(X)
	Steel:				
	Purchased ----- do..	(S)	1.1	(S)	3.5
	Produced and consumed ----- do..	(S)	(X)	(S)	(X)
336100	Aluminum and aluminum-base alloy:				
	Purchased ----- mil lb..	(S)	17.5	(S)	12.5
	Produced and consumed ----- do..	(S)	(X)	(S)	(X)
336200	Copper and copper-base alloy:				
	Purchased ----- do..	(S)	8.0	(S)	11.4
	Produced and consumed ----- do..	(S)	(X)	(S)	(X)
336902	Other nonferrous castings:				
	Purchased ----- do..	(S)	4.8	(X)	4.8
	Produced and consumed ----- do..	-	(X)	(X)	(X)
333001	Nonferrous metal smelter and refinery shapes, including precious metal ----- do..	**1.7	25.1	(S)	15.3
344401	Sheet metal products, except stampings -----	(X)	19.4	(X)	4.7
345001	Bolts, nuts, screws, rivets, and screw machine products -----	(X)	45.4	(X)	38.3
361301	Switches, except snap, toggle and push, and circuit breakers -----	(X)	55.2	(X)	55.2
362101	Electric motors, generators and parts -----	(X)	9.1	(X)	4.1

See footnotes at end of table.

Table 7. **Materials Consumed by Kind: 1982 and 1977—Con.**

Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 material code	Material	1982		1977	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3613, SWITCHGEAR AND SWITCHBOARD APPARATUS—Con.				
	Industrial electrical control equipment (received for incorporation only into other industrial electrical control equipment shipped as such, by same plant):				
62200	Purchased from other companies	(X)	189.3	(X)	101.3
62209	Received from other plants of the same company	(X)	231.6	(X)	171.9
67001	Resistors, capacitors, transformers, transducers, and other electronic-type components, except electron tubes and semiconductors	(X)	61.9	(X)	38.4
26400	Porcelain, steatite, and other ceramic electrical products	(X)	35.4	(X)	27.1
07903	Plastics products consumed in the form of sheets, rods, tubes, and other shapes	(X)	33.9	(X)	32.9
32104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes	(S)	28.7	(S)	21.5
70099	All other materials and components, parts, containers, and supplies	(X)	343.6	(X)	³ 308.4
71000	Materials, parts, containers, and supplies, n.s.k. ³	(X)	238.1	(X)	130.7
	INDUSTRY 3621, MOTORS AND GENERATORS				
	Materials, parts, containers, and supplies	(X)	2 322.6	(X)	1 796.6
	Mill shapes and forms, except castings and forgings:				
	Carbon steel:				
1011	Bars and bar shapes	**84.0	53.4	*73.2	33.1
1012	Sheet and strip	575.3	310.1	*620.1	249.7
1013	Plates	*50.3	25.0	51.8	17.5
1017	Wire and wire products	(S)	6.6	(S)	1.2
1058	All other carbon steel mill shapes and forms	(S)	25.2	*61.4	30.5
1020	Alloy steel, except stainless	**28.3	21.1	52.7	24.3
	Stainless steel:				
0133	Sheet and strip	-	-	*2.8	5.2
1050	All other stainless steel mill shapes and forms	**8.1	6.8	*2.6	5.5
	Insulated wire and cable, except magnet wire:				
5792	Copper (quantity of copper content)	(S)	40.9	**21.6	31.0
5793	Aluminum (quantity of aluminum content)	(S)	1.0	*.8	.9
5770	Magnet wire	*137.9	213.3	**169.0	193.7
	Copper and copper-base alloy:				
5728	Bare wire for electrical conduction only	(S)	17.3	**19.3	20.4
5102	Rod, bar, and mechanical wire, including extruded and/or drawn shapes	**6.9	11.4	**18.6	19.3
5143	Plate, sheet, and strip, including military cups and discs	4.8	8.0	*3.9	5.0
5152	Pipe and tube	(S)	.1	.3	.5
	Aluminum and aluminum-base alloy:				
5301	Sheet, plate, and foil	*12.7	8.3	.5	.7
5405	Extruded shapes, including extruded rod, bar, pipe, tube, etc.	*6.7	6.1	*5.0	3.9
5008	All other aluminum mill shapes and forms (wire, rolled rod and bar, powder, welded tubing)	(S)	10.0	13.9	7.6
	Primary metal:				
3122	Copper and copper-base alloy refinery shapes	1.6	3.1	(S)	.8
3401	Aluminum and aluminum-base alloy refinery shapes	29.2	34.8	**32.5	30.1
	Castings (rough and semifinished):				
2011	Iron (gray and malleable):				
	Purchased	**73.9	76.2	86.2	64.9
	Produced and consumed	(S)	(X)	(S)	(X)
2045	Steel:				
	Purchased	(S)	3.7	(S)	6.9
	Produced and consumed	(S)	(X)	(S)	(X)
6100	Aluminum and aluminum-base alloy:				
	Purchased	(S)	49.9	*35.9	40.9
	Produced and consumed	(S)	(X)	(S)	(X)
6200	Copper and copper-base alloy:				
	Purchased	(S)	5.0	*2.3	3.3
	Produced and consumed	(S)	(X)	(S)	(X)
6902	Other nonferrous:				
	Purchased	(S)	9.0	(X)	(*)
	Produced and consumed	(S)	(X)	(X)	(X)
5001	Bolts, nuts, screws, rivets, and screw machine products	(X)	37.9	(X)	28.2
6200	Iron and steel forgings:				
	Purchased	2.3	4.2	**8.0	9.2
	Produced and consumed	-	(X)	(S)	(X)
6901	Metal stampings	(S)	74.2	(X)	57.6
	Engines:				
1920	Diesel and semidiesel:				
	Purchased	(S)	99.7	12.2	31.7
	Produced and consumed	(S)	(X)	(S)	(X)
1901	Gasoline and other carburetor:				
	Purchased	*28.0	17.0	99.0	14.2
	Produced and consumed	5.5	(X)	(S)	(X)
	Bearings:				
6218	Ball	(X)	47.4	(X)	30.0
6201	Roller	(X)	2.9	(X)	4.0
6810	Plain bearings and bushings	(X)	11.2	(X)	14.7
6601	Speed changers, drives, and gears	(X)	6.3	(X)	7.1
0101	Electrical transmission, distribution, and control equipment	(X)	33.6	(X)	19.6
2001	Electrical capacitors, resistors, rheostats, and coil windings	(X)	67.1	(X)	35.7
2120	Integral horsepower electric motors and generators (1 hp or more):				
	Purchased	(S)	40.0	(S)	27.8
	Produced and consumed .....	.6	(X)	(S)	(X)
2491	Carbon brushes	(X)	8.5	(X)	(*)
7408	Semiconductors	(S)	5.8	**7.6	4.8
2104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and other shapes	*11.3	15.7	(X)	(*)

See footnotes at end of table.

Table 7. Materials Consumed by Kind: 1982 and 1977—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 material code	Material	1982		1977	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3621, MOTORS AND GENERATORS— Con.				
285101	Paints, varnishes, lacquers, shellacs, japans, enamels, and allied products ----- 1,000 gal..	(S)	16.1	(X)	(⁴)
306902	Fabricated rubber products, except tires, tubes, hose, belting, and gaskets -----	(X)	11.3	(X)	8.1
307903	Plastic products consumed in the form of sheets, rod, tubes, and other shapes -----	(X)	45.7	(X)	(⁴)
326401	Ceramic magnets (ferrite) -----	(X)	15.9	(X)	(⁴)
329601	Mineral wool insulation (fibrous glass, rock wool, mica, etc.) -----	(X)	6.5	(X)	(⁴)
265001	Paperboard boxes and containers -----	(X)	28.6	(X)	21.3
970099	All other materials and components, parts, containers, and supplies -----	(X)	448.6	(X)	⁴ 474.5
971000	Materials, parts, containers, and supplies, n.s.k. ² -----	(X)	331.9	(X)	211.2
	INDUSTRY 3622, INDUSTRIAL CONTROLS				
	Materials, parts, containers, and supplies -----	(X)	1 467.8	(X)	869.5
	Mill shapes and forms, except castings and forgings:				
	Carbon steel:				
331011	Bars and bar shapes ----- 1,000 s tons..	(S)	5.2	(S)	5.3
331012	Sheet and strip ----- do..	(S)	24.6	46.5	19.9
331013	Plates ----- do..	(S)	.6	.9	.4
331015	Structural shapes ----- do..	(S)	2.3	(S)	3.2
331055	All other carbon steel mill shapes and forms ----- do..	1.2	3.4	(S)	1.9
331020	Alloy steel, except stainless ----- do..	*1.4	1.2	(⁶)	(⁶)
	Stainless steel:				
331033	Sheet and strip ----- do..	(S)	4.5	(⁶)	(⁶)
331050	All other stainless steel mill shapes and forms ----- 1,000 s tons..	(S)	1.6	⁵ 7.1	⁵ 15.5
	Insulated wire and cable, except magnet wire:				
335792	Copper (quantity of copper content) ----- mil lb..	(S)	16.7	(S)	8.0
335793	Aluminum (quantity of aluminum content) ----- do..	(S)	.3		
335770	Magnet wire ----- do..	**3.9	7.7	**6.7	7.1
	Copper and copper-base alloy:				
335726	Bar wire for electrical conduction only ----- do..	**1.6	1.9	(S)	5.3
335102	Rod, bar, and mechanical wire, including extruded and/or drawn shapes ----- do..	(S)	9.6	(S)	8.1
335143	Plate, sheet, and strip, including military cups and discs ----- do..	**4.1	6.2	*6.1	7.2
335152	Pipe and tube ----- do..	(S)	.3	.5	.6
	Aluminum and aluminum-base alloy:				
335301	Sheet, plate, and foil ----- do..	(S)	2.0	(S)	2.6
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc. ----- do..	(S)	4.9	(S)	2.8
335008	All other aluminum mill shapes and forms (wire, rolled rod and bar, powder, welded tubing, etc.) ----- do..	(S)	6.3	.4	.5
	Castings (rough and semifinished):				
332011	Iron (gray and malleable):				
	Purchased ----- 1,000 s tons..	(S)	4.7	(X)	(⁶)
	Produced and consumed ----- do..	(Z)	(X)	(X)	(X)
332045	Steel:				
	Purchased ----- do..	(S)	2.9	(S)	10.2
	Produced and consumed ----- do..	-	(X)	(S)	(X)
336100	Aluminum and aluminum-base alloy:				
	Purchased ----- mil lb..	(S)	10.3	(S)	5.0
	Produced and consumed ----- do..	(Z)	(X)	(S)	(X)
336200	Copper and copper-base alloy:				
	Purchased ----- do..	(S)	.3	(S)	1.0
	Produced and consumed ----- do..	(Z)	(X)	(S)	(X)
336902	Other nonferrous castings:				
	Purchased ----- do..	(S)	5.8	(X)	(⁶)
	Produced and consumed ----- do..	(S)	(X)	(X)	(X)
333001	Nonferrous metal smelter and refinery shapes, including precious metal ----- do..	(S)	24.3	(S)	12.1
344401	Sheet metal products, except stampings -----	(X)	30.1	(X)	16.0
345001	Bolts, nuts, screws, rivets, and screw machine products -----	(X)	26.7	(X)	19.1
361301	Switches, except snap, toggle and push, and circuit breakers -----	(X)	33.0	(X)	11.4
362101	Electric motors, generators and parts -----	(X)	23.4	(X)	9.3
	Industrial electrical control equipment (received for incorporation only into other industrial electrical control equipment shipped as such, by same plant):				
	Purchased from other companies -----	(X)	116.7	(X)	64.7
362200	Received from other plants of the same company -----	(X)	165.0	(X)	86.0
367001	Resistors, capacitors, transformers, transducers, and other electronic-type components, except electron tubes and semiconductors -----	(X)	189.6	(X)	69.5
326400	Porcelain, steatite, and other ceramic electrical products -----	(X)	1.0	(X)	1.8
307903	Plastics products consumed in the form of sheets, rods, tubes, and other shapes -----	(X)	25.4	(X)	5.6
282104	Plastics resins consumed in the form of granules, pellets, powders, liquids, etc., but excluding sheets, rods, tubes, and shapes ----- mil lb..	(S)	15.0	(S)	8.8
970099	All other materials, parts, containers, and supplies -----	(X)	405.8	(X)	⁵ 303.0
971000	Materials, parts, containers, and supplies, n.s.k. ² -----	(X)	287.9	(X)	157.6

See footnotes at end of table.

Table 7. Materials Consumed by Kind: 1982 and 1977—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 material code	Material	1982		1977	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3623, WELDING APPARATUS, ELECTRIC				
	Materials, parts, containers, and supplies -----	(X)	576.1	(X)	577.5
	Mill shapes and forms, except castings and forgings -----	(X)	-	(NA)	(NA)
	Carbon steel:				
331011	Bars and bar shapes ----- 1,000 s tons..	**9.2	5.8	23.6	9.5
331012	Sheet and strip ----- do..	67.3	61.7	109.3	45.9
331013	Plates ----- do..	(S)	4.9	(7)	(7)
331015	Structural shapes ----- do..	(S)	2.1	11.3	4.5
331017	Wire and wire products ----- do..	58.5	70.8	247.2	80.6
331019	All other carbon steel mill shapes and forms ----- do..	25.0	10.9	717.7	78.5
	Alloy steel, except stainless:				
331021	Bars and bar shapes ----- do..	(S)	10.8	(9)	(9)
331029	All other alloy mill shapes and forms ----- do..	(S)	8.6	13.3	8.1
	Stainless steel:				
331033	Sheet and strip ----- do..	*.4	1.0	(9)	(9)
331050	All other stainless steel mill shapes and forms ----- do..	5.8	16.0	23.1	29.2
	Insulated wire and cable, except magnet wire:				
335792	Copper (quantity of copper content) ----- mil lb..	**4.0	5.7	(10)	(10)
335793	Aluminum (quantity of aluminum content) ----- do..	(D)	(D)	104.1	104.9
335770	Magnet wire ----- do..	(D)	(D)	303.3	3.3
	Copper and copper-base alloy:				
335728	Bare wire for electrical conduction only ----- do..	(S)	2.1	1.9	2.8
335102	Rod, bar, and mechanical wire, including extruded and/or drawn shapes ----- do..	*8.9	12.0	14.4	18.7
335143	Plate, sheet, and strip, including military cups and discs ----- do..	1.0	1.8	.8	1.0
335152	Pipe and tube ----- do..	*1.0	1.9	1.1	1.8
	Aluminum and aluminum-base alloy:				
335301	Sheet, plate, and foil ----- do..	1.4	1.9	(11)	(11)
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc. ----- do..	*1.4	1.4	(11)	(11)
335008	All other aluminum mill shapes and forms (wire, rolled bar, powder, welded tubing, etc. ----- do..	(S)	.4	17.8	110.0
335609	Nonferrous metal mill shapes and forms, except copper and aluminum ----- do..	(D)	(D)	(X)	(4)
	Metal powders:				
339916	Tungsten carbide ----- do..	(S)	11.3	(X)	(4)
190023	All other ----- do..	(D)	(D)	(X)	(4)
999811	Iron and steel scrap, excluding home scrap ----- do..	-	-	(X)	(4)
	Castings (rough and semifinished):				
332011	Iron (gray and malleable):				
	Purchased ----- do..	(S)	1.4	(X)	(4)
	Produced and consumed ----- do..	-	(X)	(X)	(X)
332045	Steel:				
	Purchased ----- do..	(D)	(D)	(X)	(4)
	Produced and consumed ----- do..	-	(X)	(X)	(X)
336100	Aluminum and aluminum-base alloy:				
	Purchased ----- do..	**5	1.9	(X)	(4)
	Produced and consumed ----- do..	-	(X)	(X)	(X)
336200	Copper and copper-base alloy:				
	Purchased ----- do..	**1.6	5.0	2.9	5.0
	Produced and consumed ----- do..	.5	(X)	(S)	(X)
346200	Iron and steel forgings:				
	Purchased ----- 1,000 s tons..	(Z)	(D)	(X)	(4)
	Produced and consumed ----- do..	-	(X)	(X)	(X)
	Engines:				
351920	Diesel and semidiesel:				
	Purchased ----- thousands..	(D)	(D)	(X)	(4)
	Produced and consumed ----- do..	-	(X)	(X)	(X)
351901	Gasoline and other carburetor:				
	Purchased ----- do..	153.2	18.4	(X)	(4)
	Produced and consumed ----- do..	-	(X)	(X)	(X)
362110	Fractional horsepower electric motors (under 1 horsepower):				
	Timing motors, synchronous and subsynchronous:				
	Purchased ----- do..	*204.0	4.7	(X)	(4)
	Produced and consumed ----- do..	-	(X)	(X)	(X)
362115	Other:				
	Purchased ----- do..	(S)	1.8	(X)	(4)
	Produced and consumed ----- do..	-	(X)	(X)	(X)
362120	Integral horsepower motors and generators (1 horsepower and over):				
	Purchased ----- do..	(S)	.9	(X)	(4)
	Produced and consumed ----- do..	-	(X)	(X)	(X)
	Bearings:				
356218	Ball -----	(X)	5.1	(X)	(4)
356201	Roller -----	(X)	1.7	(X)	(4)
356601	Speed changers, gears, and industrial high speed drives -----	(X)	3.5	(X)	(4)
360101	Electric transmission, distribution, and control equipment -----	(X)	10.6	(X)	(4)
362001	Electrical industrial capacitors, resistors, rheostats, and coil windings -----	(X)	18.2	(X)	(4)
265001	Paperboard containers, boxes, and corrugated paperboard -- 1,000 s tons..	**10.5	8.5	(X)	(4)
280001	Industrial chemicals -----	(X)	42.7	(X)	(4)
304101	Rubber and plastics hose and belting -----	(X)	2.2	(X)	(4)
306902	Fabricated rubber products, except tires, tubes, hose, belting, and gaskets -----	(X)	.9	(X)	(4)
329300	Gaskets (all types) and asbestos packing -----	(X)	.1	(X)	(4)
345001	Bolts, nuts, screws, washers, rivets, and screw machine products -----	(X)	4.2	(X)	(4)
970099	All other materials and components, parts, containers, and supplies -----	(X)	115.1	(X)	311.5
971000	Materials, parts, containers, and supplies, n.s.k. ² -----	(X)	67.6	(X)	32.2

See footnotes at end of table.

Table 7. **Materials Consumed by Kind: 1982 and 1977—Con.**

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1982 material code	Material	1982		1977	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3624, CARBON AND GRAPHITE PRODUCTS				
	Materials, parts, containers, and supplies -----	(X)	314.4	(X)	217.1
	Mill shapes and forms, except castings and forgings:				
	Insulated wire and cable, except magnet wire:				
335792	Copper (quantity of copper content) ----- mil lb..	(D)	(D)	(Z)	.1
335793	Aluminum (quantity of aluminum content) ----- do..	-	-	-	-
335770	Magnet wire ----- do..	-	-	-	-
	Copper and copper-base alloy:				
335728	Bare wire for electrical conduction only ----- do..	**1.1	1.9	1.4	2.2
335102	Rod, bar, and mechanical wire, including extruded and/or drawn shapes ----- do..	(S)	1.4	(D)	(D)
335143	Plate, sheet, and strip, including military cups and discs ----- do..	.6	.9	(S)	1.1
335152	Pipe and tube ----- do..	(D)	(D)	(D)	(D)
	Aluminum and aluminum-base alloy:				
335301	Sheet, plate, and foil ----- do..	-	-	(D)	(D)
335405	Extruded shapes, including extruded rod, bar, pipe, tube, etc. ----- do..	-	-	(D)	(D)
335008	All other aluminum mill shapes and forms (wire, rolled rod and bar, powder, welded tubing, etc.) ----- do..	(D)	(D)	(D)	(D)
331002	Steel ----- 1,000 s tons..	-	-	(D)	(D)
339915	Metal powders ----- mil lb..	*3.8	4.0	(X)	(*)
367408	Semiconductors ----- millions..	-	-	-	-
260001	Paper and paperboard products -----	(X)	1.0	(X)	1.5
286556	Pitch -----	(X)	(D)	(X)	15.5
299901	Coke: petroleum coke, metallurgical coke, calcined coke, foundry coke, etc., used as raw material ----- 1,000 s tons..	210.3	90.1	340.0	46.7
326400	Porcelain, steatite, and other ceramic electrical products -----	(X)	(D)	(X)	(D)
329508	Natural graphite ----- 1,000 s tons..	2.1	2.8	(S)	4.5
281991	Artificial graphite -----	(X)	8.1	(X)	(*)
329500	Carbon, ground or treated -----	(X)	23.2	(X)	(*)
281993	Calcium carbide -----	(X)	-	(X)	(*)
281631	Iron oxide pigments ----- mil lb..	(S)	.2	(X)	(*)
367501	Capacitors for electronic circuitry -----	(X)	(D)	(X)	(*)
367601	Resistors for electronic circuitry -----	(X)	(D)	(X)	(*)
970099	All other materials and components, parts, containers, and supplies -----	(X)	145.3	(X)	*131.4
971000	Materials, parts, containers, and supplies, n.s.k. ² -----	(X)	17.3	(X)	7.9
	INDUSTRY 3629, ELECTRICAL INDUSTRIAL APPARATUS, N.E.C.				
	Materials, parts, containers, and supplies -----	(X)	403.2	(X)	263.5
	Mill shapes and forms, except castings and forgings:				
	Insulated wire and cable, except magnet wire:				
335792	Copper (quantity of copper content) ----- mil lb..	**4.3	5.2	(7)	(7)
335793	Aluminum (quantity of aluminum content) ----- do..	-	-	73.3	75.8
335770	Magnet wire ----- do..	*8.6	14.3	11.4	15.5
	Copper and copper-base alloy:				
335728	Bare wire for electrical conduction only ----- do..	(S)	1.6	3.4	6.1
335102	Rod, bar, and mechanical wire, including extruded and/or drawn shapes ----- do..	1.2	1.9	(12)	(12)
335143	Plate, sheet, and strip, including military cups and discs ----- do..	(S)	1.0	.5	.6
335152	Pipe and tube ----- do..	(S)	3.3	12.9	121.1
	Aluminum and aluminum-base alloy:				
335405	Sheet, plate, and foil -----	(X)	-	6.0	8.0
335008	Extruded shapes, including extruded rod, bar, pipe, tube, etc. ----- mil lb..	(S)	1.2	(13)	(13)
331002	All other aluminum mill shapes and forms (wire, rolled rod and bar, powder, welded tubing, etc.) ----- do..	(S)	3.1	1310.6	137.0
339915	Steel ----- 1,000 s tons..	-	-	15.6	8.7
367408	Metal powders ----- mil lb..	(D)	(D)	(X)	(*)
260001	Semiconductors ----- do..	(S)	8.1	19.0	9.1
286556	Paper and paperboard products -----	(X)	11.6	(X)	23.5
299901	Pitch -----	(D)	(D)	(X)	(*)
	Coke: petroleum coke, metallurgical coke, calcined coke, foundry coke, etc. used as raw material ----- 1,000 s tons..	(X)	-	(X)	(*)
326400	Porcelain, steatite, and other ceramic electrical products -----	(D)	(D)	(X)	14.7
329508	Natural graphite ----- 1,000 s tons..	-	-	-	-
281991	Artificial graphite -----	(X)	-	(X)	(*)
329500	Carbon, ground or treated -----	(X)	-	(X)	(*)
281993	Calcium carbide -----	(X)	-	(X)	(*)
281631	Iron oxide pigments ----- mil lb..	(D)	(D)	(X)	(*)
367501	Capacitors for electronic circuitry -----	(X)	5.2	(X)	(*)
367601	Resistors for electronic circuitry -----	(X)	4.4	(X)	(*)
970099	All other materials and components, parts, containers, and supplies -----	(X)	236.3	(X)	*124.4
971000	Materials, parts, containers, and supplies, n.s.k. ² -----	(X)	101.4	(X)	39.0

¹For some establishments, data have been estimated from central unit values which are based on quantity-cost relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).²Total cost of materials of establishments that did not report detailed materials data, including establishments that were not mailed a form.³For 1977, material code 332011 was combined with material code 970099.⁴For 1977, these materials were included with material code 970099.⁵For 1977, material codes 331020 and 331033 were included with material code 331050.⁶For 1977, material codes 332011 and 338902 were included with material code 970099.⁷For 1977, material code 331013 was included with material code 331019 to avoid disclosing data for individual companies.⁸For 1977, material code 331021 was included with material code 331029 to avoid disclosing data for individual companies.⁹For 1977, material code 331033 was included with material code 331050 to avoid disclosing data for individual companies.¹⁰For 1977, material code 335792 was included with material code 335793 to avoid disclosing data for individual companies.¹¹For 1977, material codes 335301 and 335405 were included with material code 335008 to avoid disclosing data for individual companies.¹²For 1977, material code 335102 was combined with material code 335152 to avoid disclosing data for individual companies.¹³For 1977, material code 335405 was combined with 335008 to avoid disclosing data for individual companies.

APPENDIX A.

Explanation of Terms

This appendix is in two sections. Section 1 includes items which were requested of all establishments that were mailed census of manufactures forms including annual survey of manufactures (ASM) forms. Note that this section also includes several items (number of establishments and companies, value added, classes of products, and specialization and coverage ratios) that were not included on the report forms but were derived from information collected on the forms. Section 2 covers supplementary items that were requested only from establishments included in the ASM sample. Results of the supplementary ASM inquiries are included in tables 3c and 3d of this report.

SECTION 1. ITEMS COLLECTED OR DERIVED BASED ON ALL CENSUS OF MANUFACTURES (INCLUDING ASM) REPORT FORMS

Number of establishments and companies—As discussed in the Introduction, a separate report was required for each manufacturing establishment (plant) with one employee or more. An establishment is defined as a single physical location where manufacturing is performed. A company, on the other hand, is defined as a business organization consisting of one establishment or more under common ownership or control.

If the company operates at different physical locations, even if the individual locations are producing the same line of goods, a separate report was requested for each location. If the company operates in two or more distinct lines of manufacturing at the same location, a separate report was requested for each activity.

An establishment not in operation for any portion of the year was requested to return the report form with the proper notation in the "Operational Status" section of the form. In addition, the establishment was requested to report data on the number of custodial employees, capital expenditures, inventories, or any shipments from inventories during the portion of the year the plant was in operation.

In this report, data are shown for establishments in operation at any time during the year. A comparison with the number of establishments in operation at the end of the year will be provided in the Introduction to Part 1 of the General Summary subject report.

Employment and related items—The regular report forms requested separate information on production workers as of a payroll period for each quarter of the year and on other employees as of the payroll period which included the 12th of March.

All employees—This item includes all full-time and part-time employees on the payrolls of operating manufacturing establishments during any part of the pay period ending nearest the 12th of the months specified on the report form. Included are all persons on paid sick leave, paid holidays, and paid vacations during these pay periods. Officers of corporations are included as employees; proprietors and partners of unincorporated firms are excluded. The "all employees" number is the average number of production workers plus the number of other employees in mid-March. The number of production workers is the average for the payroll periods including the 12th of March, May, August, and November.

Production workers—This item includes workers (up through the line-supervisor level) engaged in fabricating, processing, assembling, inspecting, receiving, storing, handling, packing, warehousing, shipping (but not delivering), maintenance, repair, janitorial and guard services, product development, auxiliary production for plant's own use (e.g., power plant), recordkeeping, and other services closely associated with these production operations at the establishment covered by the report. Employees above the working-supervisor level are excluded from this item.

All other employees—This item covers nonproduction employees of the manufacturing establishment including those engaged in factory supervision above the line-supervisor level. It includes sales (including driver salespersons), sales delivery (highway truck drivers and their helpers), advertising, credit, collection, installation and servicing of own products, clerical and routine office function, executive, purchasing, financing, legal, personnel (including cafeteria, medical, etc.), professional, and technical employees. Also included are employees on the payroll of the manufacturing establishment who are engaged in the construction of major additions or alterations to the plant and who are utilized as a separate work force.

In addition to reports sent to operating manufacturing establishments, information on employment during the payroll period which included March 12 and annual payrolls was also requested of auxiliary units (e.g., administrative offices, warehouses, and research and development laboratories) of multiestablishment companies. However, these figures are not included in the totals for individual industries shown in this report. They are included in the general summary and geographic area reports and in the final bound volumes as a separate category.

Payrolls—This item includes the gross earnings of all employees on the payroll of operating manufacturing establishments paid in the calendar year 1982. Respondents were told they could follow the definition of payrolls used for calculating the Federal withholding tax. It includes all forms of compensation, such as salaries, wages, commissions, dismissal pay, all bonuses, vacation and sick leave pay, and compensation in kind, prior to such deductions as employees' Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds. The total includes salaries of officers

of corporations, but excludes payments to proprietors or partners of unincorporated concerns. Also excluded are payments to members of Armed Forces and pensioners carried on the active payroll of manufacturing establishments.

The census definition of payrolls is identical to that recommended to all Federal statistical agencies by the Office of Management and Budget. It should be noted that this definition does not include employers' Social Security contributions or other nonpayroll labor costs, such as employees' pension plans, group insurance premiums, and workers' compensation.

The ASM provides estimates of employers' supplemental labor costs, both those required by Federal and State laws and those incurred voluntarily or as part of collective bargaining agreements. (Supplemental labor costs are explained later in this appendix.)

As in the case of employment figures, the payrolls of separate auxiliary units of multiestablishment companies are not included in the totals for individual industries or industry groups.

Production-worker hours—This item covers hours worked or paid for at the plant, including actual overtime hours (not straight-time equivalent hours). It excludes hours paid for vacations, holidays, or sick leave.

Cost of materials—This term refers to direct charges actually paid or payable for items consumed or put into production during the year, including freight charges and other direct charges incurred by the establishment in acquiring these materials. It includes the cost of materials or fuel consumed, whether purchased by the individual establishment from other companies, transferred to it from other establishments of the same company, or withdrawn from inventory during the year.

The important components of this cost item are (1) all raw materials, semifinished goods, parts, components, containers, scrap, and supplies put into production or used as operating supplies and for repair and maintenance during the year, (2) electric energy purchased, (3) fuels consumed for heat, power, or the generation of electricity, (4) work done by others on materials or parts furnished by manufacturing establishments (contract work), and (5) products bought and resold in the same condition. (See discussion of duplication of data below.)

Specific materials consumed—In addition to the total cost of materials, which every establishment was required to report, information was also collected for most manufacturing industries on the consumption of major materials used in manufacturing. The inquiries were restricted to those materials which were important parts of the cost of production in a particular industry and for which cost information was available from manufacturers' records. Information on the specific materials consumed is shown in table 7 if appropriate to the industry. Establishments consuming less than a specified amount (usually \$10,000) of a specific material were not requested to report consumption of that material separately. Also, the cost of materials for the small establishments for which either administrative records or short forms were used was imputed as "not specified by kind." (See the Introduction for the importance of administrative records in the industry.)

Value of shipments—This item covers the received or receivable net selling values, f.o.b. plant (exclusive of freight and taxes), of all products shipped, both primary and secondary, as well as all miscellaneous receipts, such as receipts for contract work performed for others, installation and repair, sales of scrap, and sales of products bought and resold without further

processing. Included are all items made by or for the establishments from materials owned by it, whether sold, transferred to other plants of the same company, or shipped on consignment. The net selling value of products made in one plant on a contract basis from materials owned by another was reported by the plant providing the materials.

In the case of multiunit companies, the manufacturer was requested to report the value of products transferred to other establishments of the same company at full economic or commercial value, including not only the direct cost of production but also a reasonable proportion of "all other costs" (including company overhead) and profit. (See discussion of duplication of data below.)

Individual products—As in previous censuses, data were collected for almost all industries on the quantity and value of individual products shipped. In the 1982 census program, information was collected on the output of approximately 11,000 individual product items. The term "product," as used in the census of manufactures, represents the finest level of detail for which output information was requested. Consequently, it is not necessarily synonymous with the term "product" as used in the marketing sense. In some cases it may be much more detailed and, in other cases, it is more aggregative. For example, "pharmaceutical preparations" was distributed into over 100 items; whereas, "motor gasoline" was reported as a single item.

Approximately 6,000 of the product items were listed separately on the 1982 census report forms. Data for about 5,000 products were obtained in the monthly, quarterly, or annual surveys comprising the Current Industrial Reports series of the Census Bureau. Totals for the year 1982 for these items, as derived from the commodity surveys, are shown in the "products shipped" table (table 6a) together with the tieline total value collected in the census for reconciliation purposes.

The list of products for which separate information was collected was prepared after consultation with industry and government representatives. Comparability with previous figures was given considerable weight in the selection of product categories so that comparable 1977 information is presented for most products.

Typically, both quantity and value of shipments information was collected. However, if quantity was not significant or could not be reported by manufacturers, only value of shipments was collected.

Shipments include both commercial shipments and transfers of products to other plants of the same company. For industries in which a considerable portion of the total shipments is transferred to other plants of the same company, separate information on interplant transfers was also collected. Moreover, for products that are used to a large degree within the same establishment as materials or components in the fabrication of other products, total production and often consumption of the item within the plant was collected. Typically, the information on production was also collected for products for which there are significant differences between total production and shipments in a given year because of wide fluctuations in finished goods inventories. Other measures of output of products with long production cycles were used as appropriate and feasible.

Classes of products—To summarize the product information, the separate products were aggregated into classes of products that, in turn, were grouped into all primary products of each industry. The code structure used is a seven-digit number for the

individual product, a five-digit number for the class of product, and a four-digit number for the total primary products in an industry. (See Introduction, Industry Classification of Establishments, for application of the coding structure to the assignment of SIC codes for establishments.)

In the 1982 census, the 11,000 products were grouped into approximately 1,500 separate classes on the basis of general similarity of manufacturing processes, types of materials used, and the like. However, the grouping of products was affected by the economic significance of the class and, in some cases, dissimilar products were grouped because the products were not sufficiently significant to warrant separate classes.

Duplication in cost of materials and value of shipments—The aggregate of the cost of materials and value of shipments figures for industry groups and for all manufacturing industries includes large amounts of duplication, since the products of some industries are used as materials by others. With some important exceptions, such as for motor vehicles and parts, this duplication is not significant at the four-digit industry level. However, it is significant at the two-digit and three-digit industry group level because these totals often include industries that represent successive stages in the production of a finished manufactured product. Examples are the addition of flour mills to bakeries in the "Food" group and the addition of pulp mills to paper mills in the "Paper and Allied Products" group of industries. Estimates of the overall extent of this duplication indicate that the value of manufactured products exclusive of such duplication (the value of finished manufactures) tends to approximate two-thirds of the total value of products reported in the census of manufactures.

Value added by manufacture—This measure of manufacturing activity is derived by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments (products manufactured plus receipts for services rendered). The result of this calculation is adjusted by the addition of value added by merchandising operations (i.e., the difference between the sales value and the cost of merchandise sold without further manufacture, processing, or assembly) plus the net change in finished goods and work-in-process between the beginning- and end-of-year inventories.

Because of the change in instructions for reporting inventories for 1982, the 1982 figure for value added is not strictly comparable to prior-year data. This is explained more fully in the inventories section below.

"Value added" avoids the duplication in the figure for value of shipments that results from the use of products of some establishments as materials by others. Value added is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas.

New and used capital expenditures—For establishments in operation and establishments under construction but not yet in operation, manufacturers were asked to report their new expenditures for (1) permanent additions and major alterations to manufacturing establishments, and (2) machinery and equipment used for replacement and additions to plant capacity if they were of the type for which depreciation accounts were ordinarily maintained.

The totals for new expenditures exclude that portion of expenditures leased from nonmanufacturing concerns, new facilities owned by the Federal Government but operated under

contract by private companies, and plant and equipment furnished to the manufacturer by communities and nonprofit organizations. Also excluded are expenditures for used plant and equipment (although reported in the census), expenditures for land, and cost of maintenance and repairs charged as current operating expenses.

Manufacturers were also requested to report the value of all used buildings and equipment purchased during the year at the purchase price. For any equipment or structure transferred to the use of the reporting establishment by the parent company or one of its subsidiaries, the value at which it was transferred to the establishment was to be reported. Furthermore, if the establishment changed ownership during the year, the cost of the fixed assets (building and equipment) was to be reported under used capital expenditures.

Total expenditures for used plant and equipment is a universe figure; i.e., it is collected on all census forms. However, the breakdown of this figure between expenditures for used buildings and other structures and expenditures for used machinery and equipment is collected only on the ASM form and is subject to sampling error (see table 3d). The data for total new capital expenditures, new building expenditures, and new machinery expenditures, as well as the data for total used expenditures, are shown in both tables 3a and 3d. The figure in table 3a is a census universe total and may differ from the results of the ASM sample shown in table 3d. Since the figures in table 3d are subject to sampling error, they are not considered as reliable as the universe figures.

End-of-year inventories—Respondents were asked to report their 1981 and 1982 end-of-year inventories at cost or market. Effective with the 1982 Economic Censuses, this change to a uniform instruction for reporting inventories was introduced for all sector reports. Prior to 1982, respondents were permitted to value inventories using any generally accepted accounting method (FIFO, LIFO, market, to name a few). In 1982, LIFO users were asked to first report inventory values prior to the LIFO adjustment and then to report the LIFO reserve and the LIFO value after adjustment for the reserve.

Because of this change in reporting instructions, the 1982 data for inventories and value added by manufacture included in the tables of this report are not comparable to the prior-year data shown in table 1a of this report and in historical census of manufactures and annual survey of manufactures publications. Inventories and value added data estimated on a basis comparable to the historical data, using the reported information for 1982, are shown in footnote 4 of table 1a. However, the end-of-1981 figure shown in this footnote may differ from the corresponding value published as part of the 1981 Annual Survey of Manufactures.

This difference at the four-digit SIC level is due primarily to the effects of industry shifts. As described in the Industry Classification of Establishments section of the Introduction, ASM noncertainty plants are allowed to shift from one industry to another in a census year; whereas, they are "frozen" in a particular industry in ASM years. Other explanations for this difference include the effects of sampling and processing errors and revisions to end-of-1981 data reported by respondents.

In using inventory data by stage of fabrication for "all industries" and at the two-digit industry level, it should be noted that an item treated as a finished product by an establishment in one industry may be reported as a raw material by another establishment in a different industry. For example, the finished-product inventories of a steel mill would be reported as raw

materials by a stamping plant. Such differences are present in the inventory figures by stage of fabrication shown for individual industries, industry groups, and "all manufacturing," which are aggregates of figures reported by establishments in specified industries.

Specialization and coverage ratios—These items are not collected on the report forms but are derived from the data shown in table 5b. An establishment is classified in a particular industry if its shipments of primary products of that industry exceed in value its shipments of the products of any other single industry.

As noted in the Introduction, an establishment's shipments include those products assigned to an industry (primary products), those considered primary to other industries (secondary

products), and receipts for miscellaneous activities (merchandising, contract work, resales, etc.). Specialization and coverage ratios have been developed to measure the relationship of primary product shipments to the data on shipments for the industry shown in tables 1a through 5a and data on product shipments shown in tables 6a through 6c.

Specialization ratio represents the ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for the establishments classified in the industry.

Coverage ratio represents the ratio of primary products shipped by the establishments classified in the industry to the total shipments of such products that are shipped by all manufacturing establishments wherever classified.

SECTION 2. ITEMS COLLECTED ONLY ON ASM REPORT FORMS

Supplemental labor costs—Supplemental labor costs are divided into legally required expenditures and payments for voluntary programs. The legally required portion consists primarily of Federal old age and survivors' insurance, unemployment compensation, and workers' compensation. Payments for voluntary programs include all programs not specifically required by legislation whether they were employer initiated or the result of collective bargaining. They include the employer portion of such plans as insurance premiums, premiums for supplemental accident and sickness insurance, pension plans, supplemental unemployment compensation, welfare plans, stock purchase plans on which the employer payment is not subject to withholding tax, and deferred profit-sharing plans. They exclude such items as company-operated cafeterias, in-plant medical services, free parking lots, discounts on employee purchases, and uniforms and work clothing for employees. While the excluded items do benefit employees and all or part of their cost generally is similar to the items covered in the ASM labor costs statistics, accounting records do not generally provide reliable figures on net employee benefits of these types.

Cost of purchased services—ASM establishments were requested to provide information on the cost of purchased services for the repair of buildings and other structures, the repair of machinery, and communication services. Included in the cost of purchased services for the repair of buildings and machinery are payments made for all maintenance and repair work on buildings and equipment, such as painting, roof repairs, replacing parts, and overhauling equipment. Such payments made to other establishments of the same company and for repair and maintenance of any leased property are also included. Extensive repairs or reconstruction that were capitalized are considered capital expenditures for used buildings and machinery and are, therefore, excluded from this item. Repair and maintenance costs provided by an owner as part of a rental contract or incurred directly by an establishment in using its own work force are also excluded.

The response coverage ratio shown in table 3d for each of the three types of purchased services listed above is a measure of the extent to which respondents reported for each item. It is derived for each item by calculating the ratio of the weighted employment (establishment data multiplied by sample weight; see section 3) for those ASM establishments that reported the

specific inquiry to the weighted total employment for all ASM establishments classified in the industry.

Electric energy used for heat and power—Data on the cost of purchased electric energy were collected on all census forms. However, data on the quantity of purchased electric energy and quantity of generated-less-sold electric energy were collected only on the ASM forms. The cost and quantity of purchased electric energy represent the amount actually used during the year for heat and power. In addition, information was collected on the quantity of electric energy generated by the establishment and the quantity of electric energy sold or transferred to other plants of the same company.

Beginning- and end-of-year depreciable assets—The data encompass all fixed depreciable assets on the books of establishments at the beginning and at the end of the year. The values shown (book value) represent the actual cost of assets at the time they were acquired, including all costs incurred in making the assets usable (such as transportation and installation). Included are all buildings, structures, machinery, and equipment (production, office, and transportation equipment) for which depreciation reserves are maintained. Excluded are non-depreciable capital assets, including inventories and intangible assets, such as patent rights and royalties. Also excluded are land and depletable assets, such as timber and mineral rights.

The definition of fixed depreciable assets is consistent with the definition of capital expenditures. For example, expenditures include actual capital outlays during the year, rather than the final value of equipment put in place and buildings completed during the year. Accordingly, the value of assets at the end of the year includes the value of construction in progress. In addition, respondents were requested to make certain that assets at the beginning of the year plus new and used capital expenditures, less retirements, equalled assets at the end of the year.

New and used capital expenditures—The data for total new capital expenditures, new building expenditures, new machinery expenditures, and total used capital expenditures are collected on all census forms. However, the breakdown between expenditures for used buildings and other structures and expenditures for used machinery and equipment is collected only on the ASM form. (See further explanation on capital expenditures in section 1.)

Breakdown of new capital expenditures for machinery and equipment—ASM establishments were requested to separate their capital expenditures for new machinery and equipment into (1) automobiles, trucks, etc., for highway use, (2) computers and peripheral data processing equipment, and (3) all other.

The category "automobiles, trucks, etc., for highway use" is intended to measure expenditures for vehicles designed for highway use that were acquired through a purchase or lease-purchase agreement. Vehicles normally operating off public highways (vehicles specifically designed to transport materials, property, or equipment on mining, construction, logging, and petroleum development projects) are excluded from this item.

The "not specified by kind" or n.s.k. item for expenditures for new machinery and buildings, shown in table 3d, represents the total machinery and equipment expenditures for establishments that did not break down their expenditures for the three specific categories. This means that for most industries the specific categories are understated.

Retirements—Included in this item is the gross value of assets sold, retired, scrapped, destroyed, etc., during 1982. When a complete operation or establishment changed ownership, the respondent was instructed to report the value of the assets sold at the original cost as recorded in the books of the seller. The respondent was also requested to report retirements of equipment or structures owned by a parent company that the establishment was using as if it were a tenant.

Rental payments—This item includes rental payments for the use of all items for which depreciation reserves would be maintained if they were owned by the establishment, e.g., structures and buildings, and production, office, and transportation equipment. Excluded are royalties and other payments for the use of intangibles and depletable assets, and land rents where separable.

When an establishment of a multiestablishment company was charged rent by another part of the same company for the use of assets owned by the company, it was instructed to exclude that cost from rental payments. However, the book value (original cost) of these company-owned assets was to be reported as assets of the establishment at the end of the year.

If there were assets at an establishment rented from another company, and the rents were paid centrally by the head office of the establishment, the company was instructed to report these rental payments as if they were paid directly by the establishment.

Depreciation charges—This item includes depreciation and amortization charged during the year against assets. Depreciation charged against fixed assets acquired since the beginning of the year and against assets sold or retired during the year are components of this category. Respondents were requested to make certain that they did not report accumulated depreciation.

APPENDIX B.

Annual Survey of Manufactures (ASM) Sampling and Estimating Methodologies

DESCRIPTION OF SURVEY SAMPLE

The Annual Survey of Manufactures (ASM) contains two components. The mail portion of the survey is a probability sample of about 55,000 manufacturing establishments selected from a total of about 225,000 establishments. These 225,000 establishments represent all manufacturing establishments of multiunit companies and all single-unit manufacturing establishments with five employees or more tabulated in the 1977 Census of Manufactures. This mail portion is supplemented by a Social Security Administration list of new manufacturing establishments opened after 1977. The individual establishments were defined as the sampling unit for this sample. This is a change from the previous ASM sample when companies were used as the sampling unit. The implication of this change is that the probability of selection of any establishment relates only to the size of the establishment itself and is independent of the size of the company with which the establishment is affiliated. The efficiencies associated with the change to an establishment sample have made it possible to reduce the mail sample panel from 70,000 establishments in 1978 to 55,000 establishments in the current panel.

The nonmail portion of the survey includes all single-unit establishments that were tabulated with less than five employees in the 1977 Census of Manufactures. Although this portion contained approximately 125,000 establishments, it accounted for less than 2 percent of the estimate for total value of shipments at the total manufacturing level. This portion was not sampled; rather, the data for every establishment in this group were estimated based on selected information obtained annually from the administrative records of other Federal agencies. This administrative record information, which includes payroll, total employment, industry classification, and physical location of the establishment, was obtained under special conditions, which safeguard the confidentiality of both tax and census records. Estimates for data for these small establishments were developed using industry averages in conjunction with the administrative information.

The corresponding estimates for the mail and nonmail establishments were added together, along with the adjusted base-year differences as defined in Description of Estimating Procedures below. The remaining description of the survey sample relates only to the mail portion of the ASM sample.

All establishments with 250 employees or more in the 1977 census were included in the survey panel with certainty. These establishments collectively account for approximately 65 percent of the total value of shipments for manufacturing establishments in the 1977 census. Smaller establishments were sampled with probabilities ranging from 1.000 down to 0.005 in accordance with mathematical theory for optimum allocation of a sample.

The probabilities of selection assigned to the smaller establishments were proportional to measures of size determined for each establishment. For establishments included in the 1977 Census of Manufactures, the measure of size depended directly upon each establishment's 1977 product class values and the

historic variability of the year-to-year shipments of each product class. Roughly equivalent measures of size were assigned to postcensus birth establishments based on their industry codes and anticipated payroll and employment.

The method of assigning measures of size was used in order to maximize the precision (that is, minimize the variance of estimates of the year-to-year change) in the value of product class shipments. Implicitly, it also gave weight to differences in employment, value added, and other general statistics, for these are highly correlated with value of shipments. Individual sample selection probabilities were obtained by multiplying each establishment's final measure of size by an overall sampling fraction coefficient calculated to yield a total expected sample size.

The sample selection procedure gave each establishment in the sampling frame an independent chance of selection. This method of independent selection permits the rotation of establishments into and out of a given sample panel without introducing a bias into the survey estimates.

DESCRIPTION OF ESTIMATING PROCEDURES

Most of the ASM estimates for the years 1978-1981 were computed using a modified "difference estimate" formula. For each item, a base-year difference was developed. This base-year difference is equal to the difference between the 1977 census published number for an item total and the linear ASM estimate of the total for 1977. The ASM linear estimate was obtained by multiplying each sample establishment's data by its sample weight (the reciprocal of its probability of selection) and summing the weighted values.

This base-year difference was then adjusted to reflect the estimated growth at the four-digit or, in the case of product classes, five-digit based Standard Industrial Classification (SIC) level from 1977 to the year of the survey; for example, 1981. It should be noted that due to processing constraints, the growth factors lagged one year; i.e., if 1981 is the survey year, they were not based on the estimated growth from 1977 to 1981 but rather the growth from 1977 to 1980. This one-year lag had negligible effect on the estimates, particularly at the total manufacturing level where the adjusted base-year difference accounted for less than 1 percent of the estimate for total value of shipments.

These adjusted base-year differences were then added to the corresponding current-year linear estimates, which include the sum of the estimates for the mail and nonmail establishments, to produce the estimates for the years 1978-1981. Estimates developed by this procedure usually are far more reliable than comparable linear estimates developed from the current sample data alone.

The 1982 sample data included in table 3d were also developed using difference estimates. However, since the universe totals for the census year (1977 or 1982) were not known, a modification of the procedure described above was necessary. For each item in table 3d, except purchased services and breakdown of expenditures for new machinery and equipment (see further description in appendix A, section 2), linear

estimates of the publication totals from the ASM mail sample were adjusted by the difference between imputed census totals and the corresponding ASM mail sample estimates of these imputed totals. These imputed totals are obtained by applying industry average ratios to control item values at the establishment level. For example, an imputed total beginning assets figure is obtained by multiplying each establishment's total value of shipments by the industry (four-digit SIC) average for the ratio of beginning assets to shipments.

Separate estimates for the nonmail establishments were not developed. However, their contribution to the publication estimates is reflected in the difference adjustment.

The method of inventory valuation percentages included in table 3c was developed using both complete census information and ASM estimates. The percentages for the four major categories (LIFO, non-LIFO, valuation method not reported, and LIFO reported without associated value and reserve) were derived from the complete census and correspond to the values included in table 3d. The percentages for the specific non-LIFO methods of valuations (FIFO, average cost, specific costs, etc.) are ratio estimates developed from the ASM in conjunction with the census universe estimate for the total of the non-LIFO methods.

QUALIFICATIONS OF THE DATA

The estimates developed from the sample are apt to differ somewhat from the results of a survey covering all companies in the sampled lists but otherwise conducted under essentially the same conditions as the actual sample survey. The estimates of the magnitude of the sampling errors (the differences between the estimates obtained and the results theoretically obtained from a comparable, complete-coverage survey) are provided by the standard errors of the estimates.

The particular sample selected for the ASM is one of a large number of similar probability samples that, by chance, might have been selected under the same specifications. Each of the possible samples would yield somewhat different sets of results, and the standard errors are measures of the variation of all the possible sample estimates around the theoretical, comparable, complete-coverage values.

Estimates of the standard errors have been computed from the sample data for selected statistics in this report. Except for table 3c, they are presented in the form of relative standard errors, the standard errors divided by the estimated values to which they refer. In table 3c, "absolute" standard errors of the estimates are presented.

In conjunction with its associated estimate, the relative standard error may be used to define confidence intervals (ranges that would include the comparable, complete-coverage value for specified percentages of all the possible samples).

The complete coverage value would be included in the range:

1. From one standard error below to one standard error above the derived estimate for about two-thirds of all possible samples.

2. From two standard errors below to two standard errors above the derived estimate for about 19 out of 20 of all possible samples.
3. From three standard errors below to three standard errors above the derived estimate for nearly all samples.

An inference that the comparable, complete-survey result would be within the indicated ranges would be correct in approximately the relative frequencies shown. Those proportions, therefore, may be interpreted as defining the confidence that the estimates from a particular sample would differ from complete-coverage results by as much as one, two, or three standard errors, respectively.

For example, suppose an estimated total is shown as 50,000 with an associated relative standard error of 2 percent, that is, a standard error of 1,000 (2 percent of 50,000). There is approximately 67 percent confidence that the interval 49,000 to 51,000 includes the complete-coverage total and about 95 percent confidence that the interval 48,000 to 52,000 includes the complete-coverage total.

In addition to the sample errors, the estimates are subject to various response and operational errors: errors of collection, reporting, coding, transcription, imputation for nonresponse, etc. These operational errors would also occur if a complete canvass were to be conducted under the same conditions as the survey.

Explicit measures of their effects generally are not available. However, it is believed that most of the important operational errors were detected and corrected in the course of the Bureau's review of the data for reasonableness and consistency. The small operational errors usually remain. To some extent, they are compensating in the aggregated totals shown. When important operational errors were detected too late to correct the estimates, the data were suppressed or were specifically qualified in the tables.

As derived, the estimated standard errors included part of the effect of the operational errors. The total errors, which depend upon the joint effect of the sampling and operational errors, are usually of the order of size indicated by the standard error, or only moderately higher. However, for particular estimates, the total error may considerably exceed the standard errors shown.

The concept of complete coverage under the conditions prevailing for the ASM is not identical to the complete coverage of the census of manufactures, as the censuses have been conducted. Nearly all types of operational errors that affect the ASM also occur in the censuses. The ASM and the censuses, are conducted under quite different conditions, and operational errors can be better controlled in the ASM than in the censuses. As a result, for many of the census figures, the errors are of the same order of size as the total errors of the corresponding annual survey estimates. The differences between the census and ASM operating conditions also disturb, to some degree, the comparability of the ASM and census data.

Any figures shown in the tables in this publication having an associated standard error exceeding 15 percent may be of limited reliability. However, the figure may be combined with higher-level totals, creating a broader aggregate, which then may be of acceptable reliability.

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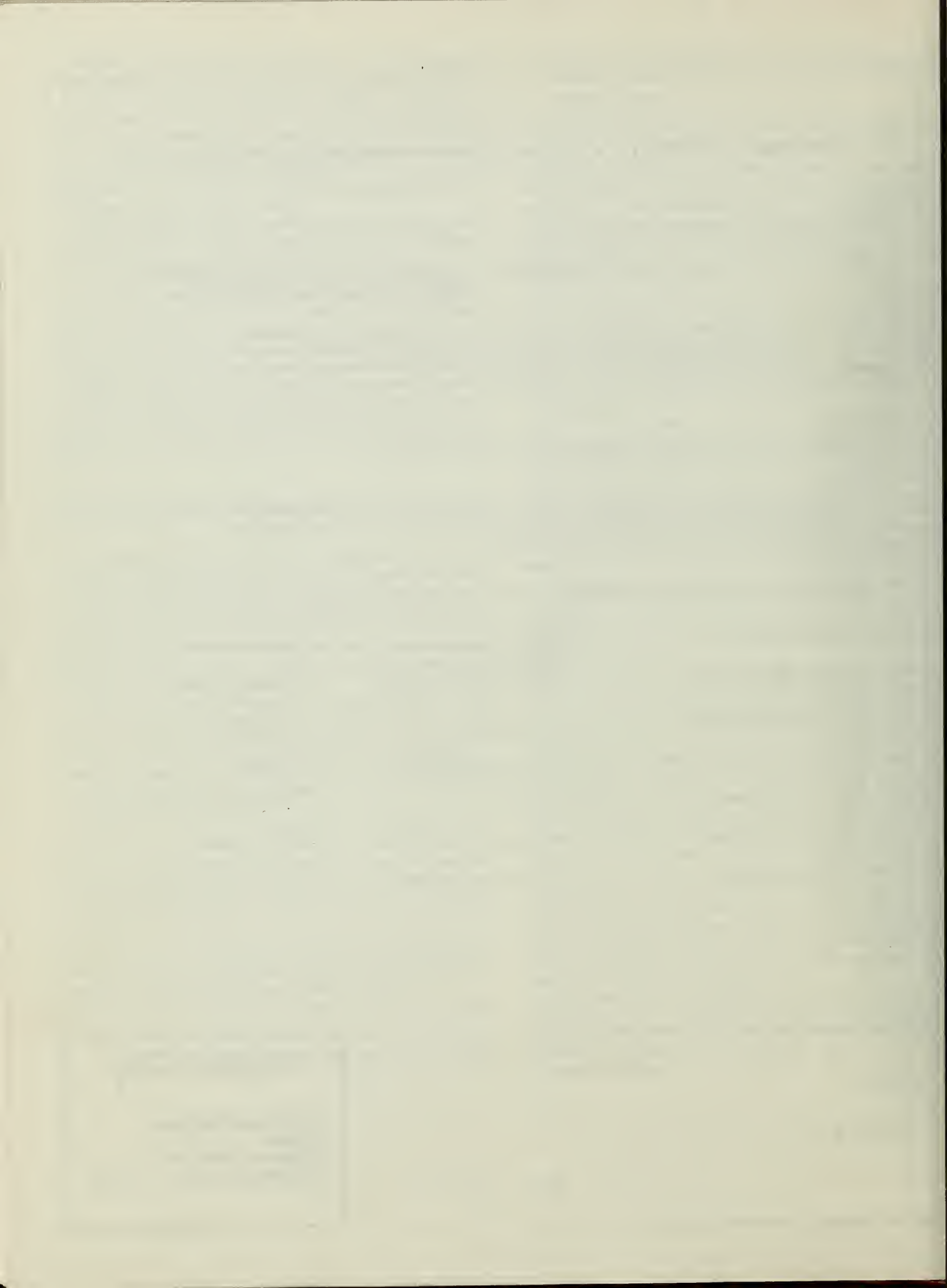
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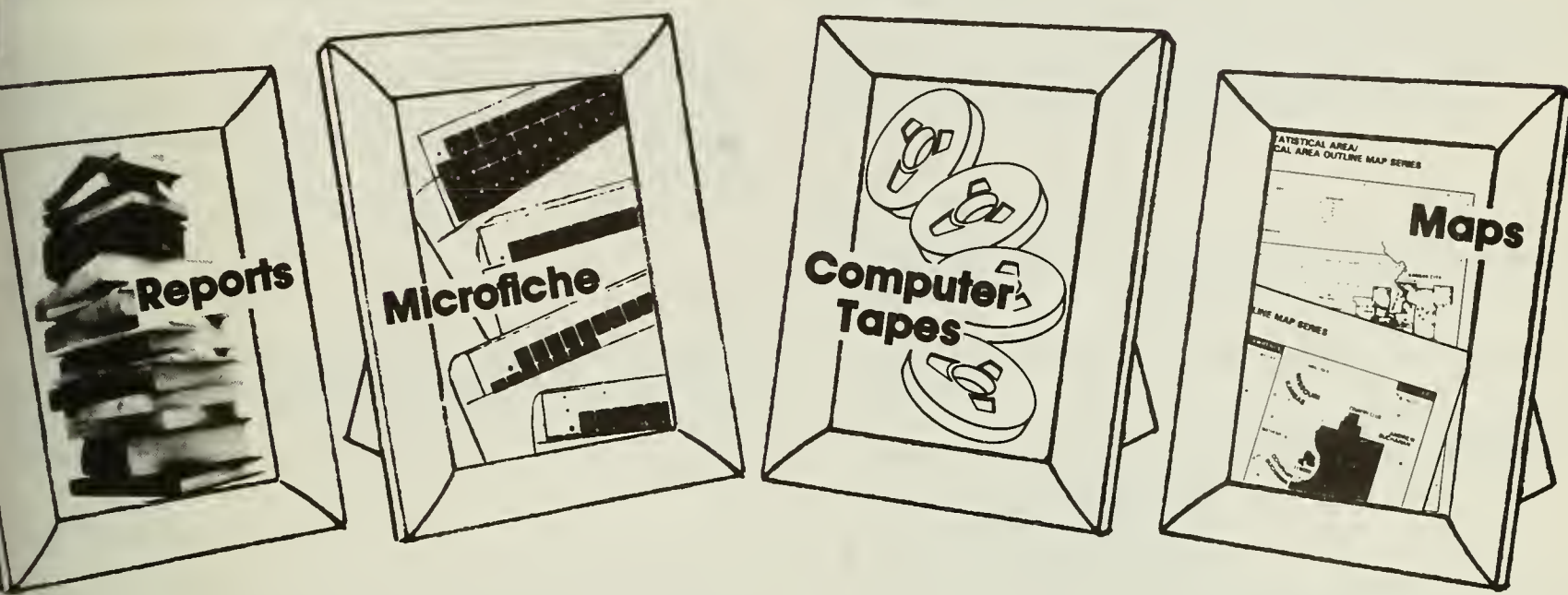
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